CODEX ALIMENTARIUS COMMISSION

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Food and Agriculture Organization of the United Nations

World Health Organization

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REP16/CF

JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX ALIMENTARIUS COMMISSION

39th Session
Rome, Italy, 27 June - 1 July 2016

REPORT OF THE 10th SESSION OF THE CODEX COMMITTEE ON CONTAMINANTS IN FOODS

Rotterdam, The Netherlands
4 - 8 April 2016

NOTE: This report includes Codex Circular Letter CL 2016/10-CF.

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CX 4/35.2 **CL 2016/10-CF**
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To: Codex Contact Points
Interested International Organisations

From: Secretariat,
Codex Alimentarius Commission,
Joint FAO/WHO Food Standards Programme,
E-mail: codex@fao.org,
Viale delle Terme di Caracalla,
00153 Rome, Italy

Subject: **DISTRIBUTION OF THE REPORT OF THE 10TH SESSION OF THE CODEX COMMITTEE ON CONTAMINANTS IN FOODS (REP16/CF)**

The Report of the 10th Session of the Codex Committee on Contaminants in Foods is attached. It will be considered by the 39th Session of the Codex Alimentarius Commission (Rome, Italy, 27 June – 1 July 2016).

PART I: MATTERS FOR ADOPTION BY THE 39TH SESSION OF THE CODEX ALIMENTARIUS COMMISSION

Proposed draft and draft standards and related texts at Step 5, 5/8 and 8 of the Codex Procedure

1. **Draft maximum level for inorganic arsenic in husked rice** at Step 8 (para. 45, Appendix II);
2. **Proposed draft revised maximum levels for lead in fruit juices and nectars, ready-to-drink (inclusion of passion fruit); canned fruits (inclusion of canned berries and other small fruits); canned vegetables (inclusion of canned leafy vegetables and canned legume vegetables); jams, jellies and marmalades (lower ML and inclusion of marmalades); pickled cucumbers (lower ML); preserved tomatoes (lower ML and deletion of the note on the adjustment of the ML to take into account the concentration of the product); table olives (lower ML)** at Step 5/8 (para. 89, Appendix III);
3. **Draft revised Code of Practice for the Prevention and Reduction of Mycotoxin Contamination in Cereals (CAC/RCP 51-2003)** (general provisions) and the **proposed draft Annexes on zearalenone, fumonisins, ochratoxin A, trichothecenes and aflatoxins** (specific provisions) at Step 8 and Step 5/8, respectively (paras. 124 and 128, Appendix IV).

Governments and international organisations wishing to submit comments on the above documents should do so in writing, in conformity with the *Procedures for the Elaboration of Codex Standards and Related Texts* (Part 3 – *Uniform Procedure for the Elaboration of Codex Standards and Related Texts*, *Procedural Manual of the Codex Alimentarius Commission*) **by e-mail**, to the above address, **before 10 June 2016**.

PART II: REQUEST FOR COMMENTS AT STEP 3

4. **Proposed draft Annex on Ergot and Ergot alkaloids in Cereal Grains** (Annex to the *Code of Practice for the Prevention and Reduction of Mycotoxoin Contamiation in Cereals* (CAC/RCP 51-2003)) (para. 142, Appendix V);

Governments and international organisations wishing to submit comments on the above document should do so in writing, in conformity with the *Procedures for the Elaboration of Codex Standards and Related Texts* (Part 3 – *Uniform Procedure for the Elaboration of Codex Standards and Related Texts*, *Procedural Manual of the Codex Alimentarius Commission*) **by e-mail**, to the above address, **before 31 August 2016**.

PART III: REQUEST FOR COMMENTS AND/OR INFORMATION

5. **Priority list of contaminants and naturally occurring toxicants for evaluation by JECFA** (para. 171, Appendix VI).

The Priority List of Contaminants and Naturally Occurring Toxicants for Evaluation by the Joint FAO/WHO Expert Committee on Food Additives (JECFA) has been endorsed by the Committee on Contaminants in Foods as indicated in para 174 and presented in Appendix VII of this Report. Submission of comments and/or information is requested as follows:

- Comments on substances that are already included in the Priority List (information on data availability of those substances should also be submitted where applicable); and/or
- Nomination of new substances for the Priority List (information on details of new substances, expected timeline for data availability should also be submitted).

For the second bullet point, respondents are requested to complete the form as contained in Appendix VII of this Report.

Governments and international organisations wishing to submit comments and/or information on the Priority List of Contaminants and Naturally Occurring Toxicants for Evaluation by JECFA should do so in writing, **by e-mail**, to the above address, **before 15 January 2017**.

SUMMARY AND CONCLUSIONS

The 10th Session of the Codex Committee on Contaminants in Foods reached the following conclusions:

MATTERS FOR ADOPTION/CONSIDERATION BY THE 39TH SESSION OF THE CODEX ALIMENTARIUS COMMISSION

Proposed draft standards and related texts for adoption

The Committee agreed to forward:

- maximum level for inorganic arsenic in husked rice at Step 8 (para. 45, Appendix II);
- maximum levels for lead in fruit juices and nectars, ready-to-drink (inclusion of passion fruit); canned fruits (inclusion of canned berries and other small fruits); canned vegetables (inclusion of canned leafy vegetables and canned legume vegetables); jams, jellies and marmalades (lower ML and inclusion of marmalades); pickled cucumbers (lower ML); preserved tomatoes (lower ML and note on the application of a concentration factor); and tables olives (lower ML) at Steps 5/8 (para. 89, Appendix III);
- revised *Code of Practice for the Prevention and Reduction of Mycotoxin Contamination in Cereals* (CAC/RCP 51-2003) (general provisions) and its annexes on zearalenone, fumonisins, ochratoxin A, trichothecenes and aflatoxins, at Steps 8 and 5/8 (specific provisions) (paras. 124 and 128, Appendix IV).

Revocation of standards

The Committee agreed to recommend the revocation of maximum levels in the *General Standard for Contaminants and Toxins in Food and Feed* (CODEX STAN 193-1995) as follows: canned raspberries; canned strawberries; canned green beans and canned wax beans; canned green peas; jams (fruit preserves) and jellies; pickled cucumbers; preserved tomatoes; and table olives; and to delete the note on the adjustment of the ML for preserved tomatoes to take into account the concentration of the products (para. 90, Appendix III).

Matters of interest to the Codex Alimentarius Commission

The Committee:

- noted matters referred to the Committee by the Commission and its subsidiary bodies and provided replies when appropriate in particular as to its work management (para. 6);
- agreed to continue working on outstanding issues related to the review of MLs for lead in fruits and vegetables (fresh and processed) and other selected food categories in the GSCTFF (para. 85);
- agreed to return maximum levels for cadmium in chocolate and cocoa-derived products for further revision, comments and consideration at its next session (para. 119);
- agreed to return the Code of Practice for the Prevention and Reduction of Arsenic Contamination in Rice (para. 100); and the Code of Practice for the Prevention and Reduction of Mycotoxins in Spices and its annexes (para. 137) for further development, comments and consideration at its next session;
- agreed to request comments on the Annex on Ergot and Ergot Alkaloids in Cereals Grains to the *Code of Practice for the Prevention and Reduction of Mycotoxin Contamination in Cereals* (CAC/RCP 51-2003) for consideration at its next session (para. 142, Appendix V);
- agreed to further consider the development of MLs for mycotoxins in spices including further prioritisation of work and clarification as to the mycotoxin(s)/spice(s) combination for which MLs should be established (para. 148);
- agreed to further consider the development of maximum levels for methylmercury in tuna (fresh/frozen and canned) and in other fish species (para. 161);
- endorsed the Priority list of contaminants and naturally occurring toxicants for JECFA evaluation (para. 171, Appendix VI); and
- agreed to consider a discussion paper on the possible inclusion of non-dioxin like PCBs in the *Code of Practice for the Prevention and Reduction of Dioxin and Dioxin-like PCB Contamination in Food and Feeds* (CAC/RCP 62-2006); the proposed draft MLs for total aflaxtoxins in ready-to-eat peanuts (held at Step 4); and the follow up on JECFA evaluation on PAs (para. 173).

Matters of interest to Codex committees and other subsidiary bodies

Committee on Spices and Culinary Herbs

- The Committee agreed to inform CCSCH that the ML or GL in the GSCTFF for leafy vegetables are not applicable to spices and culinary herbs (para. 10).

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LIST OF APPENDICES

LIST OF ABBREVIATIONS

AFB_1	Aflatoxin B_1
ALARA	As Low As Reasonable Achievable
AU	African Union
CAC	Codex Alimentarius Commission
CCCF	Committee on Contaminants in Foods
CCEXEC	Executive Committee
CCFA	Committee on Food Additives
CCMAS	Committee on Methods of Analysis
CCP	Codex Contact Point
CCSCH	Committee on Spices and Culinary Herbs
CF	Conversion Factor
CL	Circular Letter
COP	Code of Practice
CRD	Conference Room Document
CTF	Codex Trust Fund
EFSA	European Food Safety Authority
EU	European Union
EWG	Electronic Working Group
FAO	Food and Agriculture Organisation
GL	Guideline Level
GEMS/Food	Global Environment Monitoring System
GSCTFF	General Standard for Contaminants and Toxins in Food and Feed
IAEA	International Atomic Energy Agency
LOD	Limit of Detection
LOQ	Limit of Quantification
JECFA	Joint FAO/WHO Expert Committee on Food Additives
3-MCPD	3-monochloropropane-1,2-diol or 3-chloropropane-1,2-diol
ML	Maximum Level
NDL PCBs	Non-dioxin-like PCBs
OTA	Ochratoxin A
PAs	Pyrrolizidine alkaloids
PAH	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PTWI	Provisional Tolerable Weekly Intake
RTE	Ready-To-Eat
TDI	Tolerable Daily Intake
TECDOC	Technical Document
TSS	Total Soluble Solids
TTC	Threshold of Toxicological Concern Approach
USA	United States of America
WG	Working Group
WHO	World Health Organisation
WTO	World Trade Organisation
WTO/SPS Agreement	Agreement on the Application of Sanitary and Phytosanitary Measures of the World Trade Organisation

INTRODUCTION

1. The Codex Committee on Contaminants in Foods (CCCF) held its 10th Session in Rotterdam, The Netherlands, from 4 to 8 April 2016, at the kind invitation of the Government of The Netherlands. The Session was chaired by Dr Wieke Tas, Department of Animal Health and Market Access, Ministry of Economic Affairs, The Netherlands. The Session was attended by 55 Member countries, 1 Member Organisation, and Observers from 14 international organisations. The list of participants is provided in Appendix I.

OPENING OF THE SESSION

2. The Session was opened by Mr Hans Hoogeveen, Director-General of the Ministry of Economic Affairs of The Netherlands.

Division of Competence[1]

3. The Committee noted the division of competence between the European Union and its Member States, according to paragraph 5, Rule II of the Rules of Procedure of the Codex Alimentarius Commission.

ADOPTION OF THE AGENDA (Agenda Item 1)[2]

4. The Committee adopted the Provisional Agenda and agreed to establish the in-session Working Group on the *Priority list of contaminants and naturally occurring toxicants for evaluation by JECFA*, chaired by the United States of America (Agenda Item 16).

MATTERS REFERRED TO THE COMMITTEE BY THE CODEX ALIMENTARIUS COMMISSION AND/OR ITS SUBSIDIARY BODIES (Agenda Item 2)[3]

5. The Committee noted that matters referred from CAC38 and other committees were mainly for information. The following matters for action were considered:

WORK MANAGEMENT

6. The Committee reconfirmed its previous decision that guidance provided in the procedural manual and in the *General Standard for Contaminants and Toxins in Food and Feed* (CODEX STAN 193-1995) were sufficient to ensure transparent and efficient work management and therefore no additional guidance was needed.

COMMITTEE ON SPICES AND CULINARY HERBS

7. The Committee considered the request from the CCSCH on whether existing maximum levels for contaminants for leafy vegetables could apply to spices and culinary herbs or whether specific maximum levels should be developed.

8. The Committee noted that MLs or GLs established in the GSCTFF (CODEX STAN 193-1995) for leafy vegetables cannot apply to spices and culinary herbs for the following reasons:

   - the explanatory notes on the MLs and GLs for contaminants and toxins in food provided for in the GSCTFF state that for the commodities or products not contained in Codex commodity standards, the definition of the commodity or product is provided in the *Classification of foods and animal feeds* (CAC/MISC 4-1989) unless otherwise specified. According to the Classification, group "013 Leafy vegetables" belongs to the aggregate group "02 vegetables" while there is a separate aggregate group "05 Herbs and Spices" with two groups "027 Herbs" and "028 Spices", and therefore MLs or GLs established in the GSCTFF for leafy vegetables cannot apply to spices and culinary herbs
   - the consumption patterns and use conditions for leafy vegetables and spices and culinary herbs are sufficiently different to demand separate exposure assessments and hence further information is required to establish MLs for spices and culinary herbs.

9. Views were also expressed that clarification from CCSCH is required regarding the specific contaminants and the specific spice or culinary herb for which MLs are requested. This information is relevant in order to take into consideration the differences among the various plant parts (e.g. tubers, fruits, leaves) used as spice and culinary herbs and the route of contamination (e.g. air, water, fungal infection). The clarification is also required to incorporate appropriate measures for prevention and reduction in the relevant section of the code of practice.

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1 CRD1
2 CX/CF 16/10/1
3 CX/CF 16/10/2 (REV); comments of Kenya (CRD3); EU (CRD17); India (CRD23).

Conclusion

10. The Committee agreed to inform CCSCH that in its view the MLs or GLs established in the GSCTFF for leafy vegetables are not applicable to spices and culinary herbs. Countries wishing to establish MLs for contaminants in spices and culinary herbs can submit their proposals to CCCF for consideration.

MATTERS OF INTEREST ARISING FROM FAO AND WHO, INCLUDING JECFA (Agenda Item 3)[4]

11. The WHO Representatives introduced the item on behalf of FAO and WHO. The Committee was informed of the following:

12. The 80th Meeting of JECFA (June 2015) evaluated, besides several food additives, two classes of contaminants: non-dioxin-like PCBs and pyrrolizidine alkaloids (PAs). For the NDL PCBs the report has been published and the monograph will be published shortly as a supplement to the Food Additive Series 71. Main conclusions were, despite some data gaps, that the estimated margins of exposure are unlikely to be of health concern. Since main exposure is from animal-derived foods (fish, meat dairy products), limiting contamination of the food chain including exposure of food-producing animals is the best means of reducing or preventing human exposure. Regarding PAs the Committee was informed that due to the large amount of scientific information identified as a result of the systematic literature review, the evaluation is still being finalised. Based on the data evaluated at the JECFA meeting preliminary conclusions indicate a health concern by consumption of tea and honey which are carcinogenic via a genotoxic mechanism. Once finalised the monograph will also be published as a supplement to the Food Additive Series 71.

13. The JECFA Secretariat reminded the Committee that requests for scientific advice from JECFA are received from three Codex committees (i.e. CCFA, CCCF and CCRVDF) and that these requests are increasing, which requires strict prioritisation. The JECFA Secretariat is actively looking into additional ways to address requests and reminded the Committee of on-going resource needs, including for staff support, to address all requests.

14. The WHO Representative provided an update of several FAO/WHO initiatives to improve exposure assessments, including a global food consumption database on total diet studies, and an update on GEMS/Food. The brief presentation on GEMS/Food will be made available on the Codex website.

15. The Representative informed the Committee of the recently published WHO estimates on the global burden of foodborne disease which includes aflatoxins, cyanide from cassava and dioxins. Work on heavy metals is still on-going. The Representative summarised a recent activity to update the threshold of toxicological concern principle, which allows for the assessment of health concerns for chemicals occurring at low levels in food and drinking water and for which incomplete toxicological data are available. Finally the Committee was informed of a recent expert meeting to develop toxic equivalency factors for groups of related marine biotoxins, as requested by CCFFP.

16. The Representative of WHO, speaking on behalf of FAO and WHO, informed the Committee that the Codex Trust Fund successor initiative (CTF2) had come into effect on 1 January 2016 and that its focus had shifted from providing support for physical participation in Codex meetings, to building strong, solid and sustainable national capacity to engage in Codex activities.

17. The Representative further noted that CTF2 will support multi-year projects in individual countries or groups of countries tailored to meet specific needs, as well as tailored capacity development activities carried out by FAO/WHO at global, regional and sub-regional levels.

18. The Representative informed the Committee that the “Call for Applications” for the first round had opened on 8 March 2016 and that the CCPs in eligible countries had been informed of the application process and timelines. The Representative encouraged countries and groups of countries, eligible for support from the CTF, to visit the CTF website (www.who.int/foodsafety/areas_work/food-standard/codextrustfund/en) where guidelines, tools and materials for preparing and submitting applications are available. The deadline for submission of applications in the on-line system is 3 May 2016.

19. The Delegation of New Zealand commented that the recent expert meeting on TTC could support a potential resolution on an issue New Zealand would be proposing to the CCEXEC to initiate new work. This is the discovery of inadvertent very low levels of substances in food, which may cause trade disruption, that are found because of ever increasing sensitivity of analytic methods of detection. New Zealand wished to alert CCCF that if CCEXEC agreed to new work it was possible that this issue could be referred to CCCF.

4 CX/CF 15/9/3; CX/CF 15/9/3-Add.1; comments of AU (CRD4).

Further analysis of data provided by the FAO/WHO Project on Mycotoxin in Sorghum

20. On request of CCCF9 (2015) further statistical analysis has been undertaken to provide recommendations to the Committee as regards the mycotoxins of importance and the feasibility to establish MLs for these mycotoxins and propose changes to the COP on mycotoxins in cereals.

21. For mycotoxins of importance, defined as detected in at least one percent of the 1533 samples, data were presented that would allow the Committee to decide on possible MLs for total aflatoxins, fumonisins, sterigmatocystin, diacetoxyscirpenol, Zearalenone, OTA, alternariol, alternariol monomethylether.

22. In light of scheduled assessments of sterigmatocystin and diacetoxyscirpenol by JECFA in November 2016, the Committee agreed to postpone the discussion on all possible MLs pending the outcome of this assessment.

23. Regarding information from the value chain studies, recommendations were given on seeds and on postharvest practices, for consideration by the Committee for inclusion in the *Code of Practice for the Prevention and Reduction of Mycotoxin Contamination in Cereals* (CAC/RCP 51-2003) to be considered under Agenda Items 9 and 10.

24. The Delegation of Sudan noted that there were some statements in the document CX/CF 16/10/3-Add.1 in particular relating to the seeds (paragraph 12) and statistical differences in observed contamination levels between rounds (paragraph 13) that were inaccurate. The Delegation noted that the samples drawn for analysis in round 3 (storage stage) were not drawn from the same sample lots from which the same samples in round 2 had been drawn, which was why in some cases contamination levels in samples from round 3 were less than that of samples drawn from round 2, even under poor storage conditions.

25. The Committee noted the points raised by the Delegation of Sudan; that the document under discussion could not be changed at present; and that the point related to seeds could be taken up under Agenda Item 10.

Conclusion

26. The Committee noted the information provided and agreed that the in-session WG on priorities would also consider the outcome of the JECFA evaluation in order to determine any necessary follow-up actions.

MATTERS OF INTEREST ARISING FROM OTHER INTERNATIONAL ORGANISATIONS (Agenda Item 4)[5]

27. The Representative of IAEA reported on activities of the organisation relevant to the CCCF including capacity building and networking activities in various countries to enhance Codex standards and guidelines setting and implementation, and in particular on the technical document "*Criteria for Radionuclide Activity Concentrations for Food and Drinking Water*".

28. In regard to the technical document, the representative indicated that:

- the document which was informed by CODEX STAN 193-1995, focussed on "existing exposure situations". It emphasised 1 mSv/year as an appropriate dose criterion for food and drinking water and included a framework to help countries develop activity concentration levels for use as national radionuclide reference levels. The document had been approved for publication and an electronic copy would be available soon
- the document will also assist national authorities investigate the implication of changing the reference level or the activity concentration of radionuclides in a particular food. The Representative added that details could be found in the published technical document.

29. In response to a request for further clarification, the Representative reported that the technical document would focus on situations not following a radiological or nuclear emergency. The Representative added that the technical document stresses how other than in emergency situations, the Codex GLs are appropriate for almost all situations and values higher than 1mSv per year as those criteria for food and drinking water should be adopted for national use only when justified.

5 CX/CF 16/10/4

DRAFT MAXIMUM LEVEL FOR INORGANIC ARSENIC IN HUSKED RICE (Agenda Item 5)[6]

30. The Delegation of Japan, as Chair of the EWG, introduced the item. The Delegation reminded the Committee of the decision of the last session to advance the proposed draft ML for inorganic arsenic in husked rice to CAC38 for adoption at Step 5 (with a note for total arsenic as a screening method) and that this had been adopted at Step 5. In accordance with the need for more geographic data, the last session of the Committee had further agreed to establish an EWG to consider additional new data to confirm or change the draft ML of 0.35 mg/kg.

31. The Delegation reported that the EWG had analysed new additional data along with data submitted previously (combined data included 3861 records of 12 members from 5 regions) and considered the ability of methods of analysis to determine the compliance to an ML with two significant figures. The EWG estimated the mean concentration of inorganic arsenic in husked rice and potential rate of violation at each ML proposal as well as an analysis of the impact of the ML proposal on inorganic arsenic intakes.

32. The analysis showed that for the ML of 0.35 mg/kg, the intake of inorganic arsenic from husked rice would be reduced by 4.3% and the violation rate would be 1.8%, while the reduction in intake and violation rate for the proposed MLs are 9.9% and 7.3% for an ML at 0.25 mg/kg; 6.4% and 3.4% for an ML at 0.3 mg/kg; and 2.8% and 1.0% for an ML at 0.4 mg/kg. The Delegation indicated that the violation rate for polished rice with an ML of 0.2 mg/kg was around 2% and that the level of 0.35 mg/kg for husked rice was around the same if the same path of analysis were followed.

33. The EWG further confirmed that available methods of analysis could measure an ML with two significant figures.

Discussion

34. The Committee first considered whether to retain the level of 0.35 mg/kg.

35. The Delegation of EU indicated their preference for a lower ML of 0.25 mg/kg as it would reduce dietary exposure by almost 10% and as it would be compatible with ML of 0.2 mg/kg for polished rice. The ML of 0.35 mg/kg would not result in an important reduction of intake of inorganic arsenic and would not be coherent with the ML for polished rice. If the ML of 0.35 mg/kg were maintained, it would mean that 24% of polished rice derived from compliant husked rice would be non-compliant and that could have implications for trade. This position was supported by various other members and observers.

36. The Delegation of India did not support the ML of 0.35 mg/kg as it was of the opinion that not all the concentration data had been taken into account in affirming the level. The Delegation pointed out that the document indicated that the mean concentration levels were calculated by excluding concentration data above the draft ML and mean concentrations would thus be lower. Therefore, mean concentrations were not representative of the entire data set but only the data set below the draft ML. The Delegation expressed its concern on the data analysis approach taken in the EWG whereby concentration data above the draft ML of 0.35 mg/kg from the new/additional data were not considered which was not consistent with the decision of CCCF9. This approach had deprived the Committee from taking informed decisions based on the entire data set and was contrary to the principle of transparency. Therefore the Delegation of India was of the opinion that the draft ML should be 0.5 mg/kg.

37. The Delegation of Japan, as Chair of the EWG, clarified that all the concentration data had been taken into account and that the same approach as for the establishment of the ML for inorganic arsenic for polished rice had been followed. This approach was similarly being used for the work on lead currently under discussion in the Committee.

38. Those delegations in support of advancing the level of 0.35 mg/kg for adoption were of the opinion that this level provided a good balance between reducing exposure to inorganic arsenic and protection of consumer health and the violation rate; and this level aligned with the already adopted ML for polished rice. The Delegation of Japan clarified that according to the Japanese data (CX/CF 14/8/6), the median of the ratio of the inorganic arsenic concentration in polished rice to that in the corresponding husked rice is 0.60 (5^{th} percentile, 0.42; and 95^{th} percentile, 0.79). Calculation of the inorganic arsenic concentration in husked rice using the aforementioned ratio and the inorganic arsenic in polished rice at the adopted ML of 0.2 mg/kg results in the median value of 0.33 mg/kg with 5^{th} percentile at 0.26 mg/kg and 95^{th} percentile at 0.48 mg/kg. The calculated median value of 0.33 mg/kg is very close to the current draft ML of 0.35 mg/kg, which indicates that the current draft ML for husked rice was consistent with the ML for polished rice.

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6 REP15/CF Appendix V; CL 2015/32-CF; CX/CF 16/10/5; comments of Chile, Colombia, Costa Rica, Ecuador, Egypt, El Salvador, Ghana, India, Indonesia, Japan, Kenya, Peru, Republic of Korea, AU (CX/CF 16/10/6); comments of Senegal, Thailand, USA, Consumers International (CRD6); EU (CRD17); Malaysia (CRD20); Mali (CRD27); Peru (CRD29).

39. There was support for the draft ML of 0.35 mg/kg, but also support for the proposal of EU for an ML of 0.25 mg/kg. Noting the lack of consensus, the Committee considered a proposal by the Chair to discontinue the work on the ML for inorganic arsenic in husked rice.

40. There was limited support to discontinue the work as views were expressed that an ML would assist in reducing exposure to inorganic arsenic, a known carcinogen and thus protection of consumer health; and that there was a possibility that countries would apply the ML for polished rice to husked rice or that there would be different MLs applied by countries, which could impact negatively on the trade of husked rice.

41. As a compromise, and noting the ongoing work on the COP for the prevention and reduction of arsenic in rice, the Chair proposed that the level of 0.35 mg/kg be accepted on the understanding that following the implementation of the COP (of which one of the aims is to assist in the meeting of the ML for polished rice and husked rice) the Committee would consider all available data with the intention to lower the ML (Agenda Item 7).

42. The Committee generally supported this proposal, while the Delegation of the EU was of the opinion that it could only support this proposal if it were agreed that the EU could maintain their current ML; and that it was made clear that the aim of the future revision of the ML would be to lower the ML to 0.25 mg/kg.

43. The observer of Consumers International opposed this proposal, because it was not expected to meaningfully reduce consumers' exposure to inorganic arsenic or the associated human health risk. The Observer further noted that many members were also opposed to this ML. According to the EWG, this ML would affect just 1.8% of husked rice and reduce consumers' exposure to inorganic arsenic in husked rice by just 4.3%. According to the EWG, it would not reduce consumers' exposure in 10 of the 17 geographic clusters. Furthermore because the COP was still several years from implementation, and the ML, if adopted, would not be re-evaluated for three years after this implementation, the decision to advance the 0.35 mg/kg could result in this ML remaining in place for many years, despite the lack of agreement. A more appropriate approach would have been to either advance a lower ML, or to discontinue work until the Code of practice was implemented so that agreement on an appropriate ML might be reached later.

Conclusion

44. The Committee:

- agreed to advance the ML of 0.35 mg/kg for husked rice for adoption by CAC39 on the understanding that the ML would be reviewed three years after the implementation of the *Code of Practice for prevention and reduction of arsenic in rice*, and would take into account all available data to clearly lower the ML of 0.35 mg/kg
- noted the reservations of EU and Norway, and India for the reasons expressed in paragraphs 35 and 42, and 36, respectively.

The Observer of Consumers International reiterated its concern with this decision for the reasons expressed in paragraph 43.

STATUS OF THE DRAFT ML FOR INORGANIC ARSENIC IN HUSKED RICE

45. The Committee agreed to advance the ML for adoption at Step 8 by CAC39 (Appendix II).

PROPOSED DRAFT REVISION OF MAXIMUM LEVELS FOR LEAD IN SELECTED FRUITS AND VEGETABLES (FRESH AND PROCESSED) IN THE GENERAL STANDARD FOR CONTAMINANTS AND TOXINS IN FOOD AND FEED (CODEX STAN 193-1995) (Agenda Item 6)[7]

46. The Delegation of USA, as Chair of the EWG, introduced the item and reminded the Committee that this work followed previous work on the review of MLs started in 2012 following the outcome of JECFA73 (2010) safety evaluation of lead where the PTWI of 25 µg/kg bw had been withdrawn and a new PTWI that would be considered health protective had not been possible to establish. As no safe levels were identified by JECFA, the Delegation explained that the focus of the review was to assess the occurrence data of lead in those commodities for which MLs were allocated in the GSCTFF, to determine what percentage of samples could meet the revised (lower) MLs. The Delegation therefore confirmed that the proposals were not based on levels of maximal permissible exposure or consumption.

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7 CX/CF 16/10/7; comments of Canada, Colombia, Costa Rica, Ecuador, El Salvador, Ghana, India, Indonesia, Kenya, Republic of Korea, AU (CX/CF 16/10/7-Add.1); Japan, Senegal, Thailand, USA (CRD7); Dominica (CRD16); EU (CRD17); Mali (CRD27).

47. As regards the data procedure, the Delegation explained that occurrence data for the past 10-15 years had been taken from the GEMS/Food Database and processed in two steps to produce two data-sets namely: (1) a raw data set which excluded samples not meeting the basic criteria e.g. cooked or otherwise processed fruits and vegetables, and (2) a LOQ-limited data set based on the limit of quantification of the analytical method associated with each sample which excluded samples with no reported LOQ or with a LOQ higher than the Codex ML for the particular food. The final step in the analysis was to prepare tables showing the percentage of lead level results in the LOQ-limited dataset that met the current and hypothetical (lower) ML and to make recommendations to reduce or maintain the ML based on those percentages. The percentage value would be consistent with the current occurrence data and would provide some reduction in the lead level, but without having too significant an impact on international trade. There was no specific rule to identify the appropriate cut-off value, but in general the approach was to recommend reduction in MLs when the percentage of excluded samples was less than 5%.

48. The Delegation noted that the above approach had consistently been applied in the review of the MLs for lead in the previous sessions of the Committee to ensure coherence in the recommendations made on the MLs for lead in the GSCTFF.

49. The Delegation further explained that, in cases where the Committee had previously identified MLs for broad food categories (e.g. canned vegetables), but excluded certain subsets (e.g. canned leafy vegetables), the review focused on whether data supported extending the ML of the broad food category to the individual food category or to the subset food category(ies) that had formerly been excluded from the broad category by the Committee.

50. The Chair reminded the Committee that when possible, MLs for broad food categories as opposed to MLs for the individual food category or subset(s) of the broad categories should be established.

51. The Committee considered the recommendations of the EWG as follows:

Juices and nectars from berries and other small fruits

52. The Committee recalled that CCCF9 had agreed to exclude juices and nectars from berries and other small fruits from the ML for fruit juices and nectars, ready-to-drink (ML = 0.03 mg/kg) and to further consider an ML for this subset category at its present session.[8]

53. The Committee agreed to postpone the decision on juices and nectars from berries and other small fruits to allow submission of new data, and to consider whether the ML for fruit juices and nectars, ready-to-drink (ML = 0.03 mg/kg) could apply or whether a higher separate ML of 0.04 mg/kg for this subset category should apply and to take a decision at CCCF11 (2017).

54. The Committee noted that, in line with its previous decision, this food category should refer to "fruit juices and nectars *that are obtained exclusively* from berries and other small fruits"[9] and not to mixtures of juices from berries and small fruits with juices from other fruits.

Passion fruit juice and nectar

55. The Committee recalled that CCCF9 had decided to postpone the decision on inclusion of passion fruit in the broad category of fruit juices and nectars, ready-to-drink pending submission of new data.[10] The Delegation of USA, as Chair of the EWG, noted that new data and comments in the EWG from a major producing country of passion fruit juice indicated that it was possible to include passion fruit juice in the broader category of fruit juices.

56. The Committee agreed to include passion fruit juice in the broad category of fruit juices and nectars, ready-to-drink (ML = 0.03 mg/kg).

Canned berries and other small fruits

57. The Committee noted that current data supported extending the ML of canned fruits (ML = 0.1 mg/kg) to the subset of canned berries and other small fruits.

58. The Committee agreed to include this subset into the broader category of canned fruits (ML = 0.1 mg/kg) and to revoke the individual MLs for canned raspberries and canned strawberries.

Canned leafy vegetables and canned legume vegetables

59. The Committee noted that current data supported extending the ML for canned vegetables (ML = 0.1 mg/kg) to the subset of canned leafy vegetables and canned legume vegetables.

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8 REP15/CF, para. 37, REP13/CF, para. 31.
9 REP15/CF, para. 37.
10 REP15/CF, para. 36.

60. The Committee agreed to include these subsets into the broad category of canned vegetables (ML = 0.1 mg/kg) and to revoke the individual MLs for canned green beans and canned wax beans and canned green peas.

Canned brassica vegetables

61. The Committee noted that current data were not sufficient to support extending the ML for canned vegetables (ML = 0.1 mg/kg) to the subset of canned brassica vegetables.

62. Since the ML for brassica vegetables was the same as the ML for canned vegetables (MLs = 0.1 mg/kg) and as current canning processes no longer gave rise to dramatic increases in lead content of canned products, a proposal was made to align the ML for the canned products to the ML for the corresponding fresh products awaiting additional data. It was, however, noted that before deriving MLs for processed products from the corresponding fresh produce, it would be preferential to gather additional data for the canned product itself. Subsequently alternative ways to derive an ML for this subset food category could be explored.

63. The Committee agreed to keep the note excluding canned brassica vegetables from the broad category of canned vegetables pending additional data and to take a decision at CCCF11.

Jams (fruit preserves) and jellies

64. The Committee noted that although the vast majority of samples in the jams and jellies analysis came from one country, such samples came from products that were not domestically produced but imported from different regions, and therefore reflected an ample variety of countries of origin.

65. As regards the question on whether marmalades should be included in the ML for jams and jellies, the Committee noted information provided by the Codex Secretariat that: the scope of CODEX STAN 296-2009 did cover jams, jellies and marmalades; the scope of the Standard did not cover reduced/low sugar products or products where sugars had been whole or partially replaced by food additive sweeteners; and that provisions for marmalades allowed for “citrus” marmalades and “non-citrus” marmalades to accommodate industry practices worldwide.

66. Based on the above information, the Committee agreed to lower the ML from 1 mg/kg to 0.1 mg/kg and to apply this ML to jams, jellies and marmalades, and to revoke the ML for jams (fruit preserves) and jellies.

Mango chutney

67. The Committee had an exchange of views on the opportunity to combine mango chutney with the broad category of jams, jellies and marmalades if insufficient data were available to consider mango chutney as an individual category in 2017.

68. The Delegation of India noted that the composition of mango chutney and chutneys in general were different from jams, jellies and marmalades, e.g. different fruit content, different percentage of TSS and different types of ingredients (salt, spices, condiments such as vinegar, onion, ginger, etc.) and therefore this food category could not be combined with that of jams, jellies and marmalades.

69. The Committee agreed to maintain the current ML of 1 mg/kg pending additional data. The Delegation of India was requested to provide technical justification to the EWG that mango chutney could not be combined with that of jams, jellies and marmalades. If insufficient data were available to consider mango chutney as a stand-alone category in 2017, the inclusion of mango chutney with a broad food category such as jams, jellies and marmalades would be considered by the EWG.

70. The Chair urged those member countries interested in keeping mango chutney as a stand-alone category to submit data to GEMS/Food for consideration by the EWG. In addition, a justification from the point of view of risk assessment should be submitted on why these two food categories could not be merged if data available did not support retaining mango chutney as a stand-alone category in 2017.

Canned chestnuts and chestnut puree

71. The Committee agreed to maintain the current ML of 1 mg/kg pending additional data.

72. The Committee further agreed that if insufficient data were available to consider canned chestnuts and chestnut puree as a stand-alone category in 2017, the EWG would consider combining canned chestnuts and chestnut puree with canned fruits (ML = 0.1 mg/kg).

Pickled cucumbers (cucumber pickles)

73. The Committee agreed to lower the ML from 1 mg/kg to 0.1 mg/kg and to revoke the previous ML.

Preserved tomatoes and processed tomato concentrates

74. The Committee noted the following comments:

- the number of samples available was not sufficient to carry out a statistical analysis of the worldwide production
- products with limited number of samples such as for processed tomato concentrates (21 results) required a consideration of a minimum acceptable number of samples for proposing a revised ML
- increased number of samples would give a more realistic idea of the violation rates and their impact on international trade
- consideration could be given to combine data for preserved tomato and processed tomato concentrates to increase the dataset to establish a broader ML for both categories or to consider their inclusion in the broader categories to avoid proliferation of individual MLs
- proposals for acceptable minimum number of samples submitted by a member country were around 50 – 60 samples, thus a single revised ML for preserved tomato could be established while waiting on additional data for processed tomato concentrates to take a decision in 2017
- consideration of revised ML vis-à-vis an acceptable number of minimum samples should be considered on a case-by-case basis rather than setting a minimum number of samples for proposing a revised ML that might not be applicable in all scenarios.

75. In view of the above comments, the Committee agreed to lower the ML from 1 mg/kg to 0.05 mg/kg for preserved tomatoes and to remove the note for the determination of an adjusted ML to consider the concentration of the product taking into account the relation between the TSS in the concentrate and in the fresh fruit (CF = 4.5) as not necessary. The Committee further agreed to revoke the previous ML for preserved tomatoes. (ML = 1 mg/kg).

76. The Committee further agreed to retain the ML of 1.5 mg/kg for processed tomato concentrates pending additional data and to take a decision at CCCF11.

Table Olives

77. The Committee agreed to lower the ML from 1 mg/kg to 0.4 mg/kg; to re-evaluate table olives in future when more data became available, and to revoke the previous ML.

Fresh fungi and mushrooms

78. The Committee recalled that in view of the exclusion of fungi and mushrooms from the ML for fruiting vegetables other than cucurbits, MLs for these commodities should be considered by CCCF.[11]

79. The Committee noted that work on MLs for lead related to the review of existing MLs for lead in the GSCTFF and therefore fungus products including dried fungi were not part of the review process.

80. The Delegation of China noted, that studies on the occurrence of lead in various species of fresh and dried fungi species were ongoing, and that results of these studies would become available within the year. So, different MLs might be needed. The Committee then noted that such additional data should be submitted to GEMS/Food that might allow further analysis to propose a revised ML for consideration by CCCF11 and the EWG to consider the establishment of different MLs for different species / group of species of fungi if appropriate and feasible.

81. The Committee further noted a comment by which, as the focus of the work was to review existing MLs based on occurrence data without considering level of exposure or consumption pattern, the same approach might not be ideal for establishing a new ML for fungi and mushrooms. In addition, the exclusion of fungi and mushrooms from the category of fruiting vegetables other than cucurbits clearly indicated that the approach used for this food category might not be applicable to fungi and mushrooms due to different consumption patterns. Therefore, a new ML of 0.3 mg/kg would not be recommendable at this point.

82. The Committee therefore agreed to await additional data to propose an inclusive ML for fungi and mushrooms or to consider the setting of MLs for mushrooms and different species/group of species of fungi if appropriate and feasible and to consider this category at CCCF11.

Editorial amendments

83. The Delegation of USA, as Chair of the EWG, explained that following the adoption of MLs for berries and other small fruits (ML = 0.1 mg/kg)[12] there was no need to exclude this subset category from the broader category for fruit (ML = 0.1 mg/kg) and therefore both food categories should be combined.

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11 REP15/CF, paras. 47 and 48.
12 REP15/CF, para. 41.

84. The Committee noted that this was an editorial amendment and agreed to combine the two food categories (MLs = 0.1 mg/kg) and make the necessary adjustments to the ML for fruits so that it accommodate berries and other small fruits.

Future work

85. The Committee agree to continue working on the following food categories: fruit juices and nectars that are obtained exclusively from berries and other small fruits; canned brassica vegetables; canned chestnuts and chestnut puree; fungi and mushrooms; mango chutney; processed tomato concentrates and to add two new food categories i.e. fish and pulses for consideration by CCCF11.

Other matters

86. A Delegation noted that it was important that the section on contaminants in Codex commodity standards be aligned with the standardised text as provided in the Procedural Manual so that the GSCTFF remained the single reference for MLs for contaminants and toxins in food and feed.

87. The Committee noted that following the revision of certain MLs there would be consequential amendments to the section on contaminants for relevant commodity standards, e.g. preserved tomatoes, pickled vegetables.

Conclusion

88. The Committee agreed to re-establish the EWG chaired by USA and working in English only to continue work on the review of the MLs for lead in the GSCTFF as described in future work (paragraph 85).

STATUS OF THE PROPOSED DRAFT REVISION OF MLS FOR LEAD IN SELECTED FRUITS AND VEGETABLES (FRESH AND PROCESSED) IN THE GSCTFF (CODEX STAN 193-1995)

89. The Committee agreed to forward to CAC39 the proposed draft revised MLs for fruit juices and nectars, ready-to-drink (inclusion of passion fruit) (ML = 0.03 mg/kg); canned fruits (inclusion of canned berries and other small fruits) (ML = 0.1 mg/kg); canned vegetables (inclusion of canned leafy vegetables and canned legume vegetables) (ML = 0.1 mg/kg); jams, jellies and marmalades (revised ML = 0.1 mg/kg and inclusion of marmalades); pickled cucumbers (revised ML = 0.1 mg/kg); preserved tomatoes (revised ML = 0.05 mg/kg and deletion of the note on the adjustment of the ML to take into account the concentration of the product); table olives (revised ML = 0.4 mg/kg)for adoption at Step 5/8 (Appendix III).

90. The Committee also agreed to request CAC39 to revoke the MLs for lead in the GSCTFF for the following food categories: canned raspberries (ML = 1mg/kg), canned strawberries (ML = 1 mg/kg), canned green beans and canned wax beans (ML = 1 mg/kg); canned green peas (ML = 1 mg/kg); jams (fruit preserves) and jellies (ML = 1 mg/kg); pickled cucumbers (1 mg/kg); preserved tomatoes (ML = 1 mg/kg); and table olives (ML = 1 mg/kg) (Appendix III).

PROPOSED DRAFT CODE OF PRACTICE FOR THE PREVENTION AND REDUCTION OF ARSENIC CONTAMINATION IN RICE (Agenda Item 7)[13]

91. The Delegation of Japan, as Chair of the EWG, introduced the item. The Delegation reminded the Committee of the reason behind the need for the COP (i.e. to provide countries with management practices to minimise arsenic contamination and in support of the implementation of MLs); and the decisions taken at the last session, i.e. that the scope should be limited to source directed measures and agricultural measures to reduce and prevent arsenic contamination in rice and that guidance for consumers should be included under risk communication. The Delegation noted that the EWG had tried to collect information and data on measures that were already being implemented and proved effective or were under consideration in countries/regions to help in the further development of the COP. However, no new information and data on effective/implemented/proved measures had been received, although member countries participating in the EWG had informed the EWG that they were conducting various studies from which the information and data would only become available in the next 2 to 3 years.

92. The Delegation proposed that the work either be postponed (pending the results of the studies being undertaken) or that work should continue on finalizing the COP (with the currently available information) on the understanding that the COP could be revised when information from such studies became available. The Delegation noted that the COP should, however, be practical and based on measures that have been proven to be effective for prevention and reduction of arsenic in rice and can be implemented worldwide.

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13 CX/CF 16/10/8; comments of Costa Rica, Ecuador, Egypt, Ghana, India, Indonesia, Kenya, Nicaragua, Peru, Republic of Korea, AU (CX/CF 16/10/8-Add.1); Thailand, USA (CRD8); EU (CRD17); Dominican Republic (CRD22); Mali (CRD27); Peru (CRD29).

93. There was general agreement on the need for work to continue on the COP, but varying views on how to proceed.

94. Those in favour of proceeding with finalisation of a version of the COP based on the currently available information were of the opinion that such a short version could be finalised in 2017 with the current available information to support the MLs for inorganic arsenic in polished rice (adopted) and in husked rice; and that the COP could be revisited once the results of the ongoing studies became available.

95. Those in favour of postponing finalisation of the COP, were of the opinion that current information was not sufficient; and that since studies were being conducted, it was necessary to wait on the outcome of these studies to ensure that all necessary information and practices were taken into account in the development of the COP.

96. The Codex Secretariat noted that it might not be appropriate to postpone work on the COP even before the deadline for completion of work has been reached and that this was of particular relevance within the framework of the Critical Review carried out by CCEXEC for the monitoring of the development of Codex standards and related texts and their timeframe for completion of work. The Secretariat then proposed that the Committee continue with development of the COP for finalisation by the next session taking into account all available information worldwide. The Secretariat noted that the EWG had only considered information provided by members of the EWG and that it was possible that members and organisations who had not participated in the EWG might have further information and data available to assist in the finalisation of the COP. The Secretariat therefore proposed to issue a CL requesting further information and data to assist the EWG in the development of the COP for consideration by the next session of the Committee. The Secretariat noted that if it was not possible to finalise the COP at the next session, then a new timeline for its finalisation could be proposed to CCEXEC.

97. The Representative of FAO informed the Committee that there was considerable interest in the topic of arsenic in rice outside Codex Alimentarius and involved various departments within FAO and WHO. FAO and WHO were currently in talks to develop joint work on the topic of arsenic in rice and offered to report back at a suitable time to the Committee with the goal to provide additional information that the Committee might consider in future amendments to the COP for lowering the levels of arsenic in rice as suitable. The Representative also expressed the willingness of FAO and WHO to provide information in response to the CL.

98. The Committee agreed that the information required through the CL should be as flexible as possible and should allow countries to provide information and data on any of the points raised in the CL; that it should be emphasised that the management measures submitted must have been proven effective; and should also allow submission of information on ongoing studies, their scope and when the results would become available.

Conclusion

99. The Committee agreed to continue work on the finalisation of the COP through an EWG to be chaired by Japan and co-chaired by Spain, and working in English only, taking into account all decisions previously taken by the Committee, the adequacy of all current and new information submitted in response to the aforementioned CL as well as written comments submitted at this session, for consideration by the next Session of the Committee with the understanding that the COP could be reviewed in future when more information and data became available.

STATUS OF THE PROPOSED DRAFT CODE OF PRACTICE FOR THE PREVENTION AND REDUCTION OF ARSENIC CONTAMINATION IN RICE

100. The Committee agreed to return the COP to Step 2/3 for further development, comments and consideration by CCCF11.

PROPOSED DRAFT MAXIMUM LEVELS FOR CADMIUM IN CHOCOLATE AND COCOA-DERIVED PRODUCTS (Agenda Item 8)[14]

101. The Codex Secretariat informed the Committee of the mistake in the title of CX/CF 16/10/9 which referred to "*cocoa*" instead of "*chocolate*" and noted that for consistency with the title of the project document for new work approved by CAC37 (2014) the title should refer to MLs for *chocolate* and cocoa-derived products.

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[14] CX/CF 16/10/9; comments of Australia, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Egypt, El Salvador, Ghana, India, Indonesia, Kenya, Republic of Korea, AU, ECA, FoodDrinkEurope, ICA, ICGMA (CX/CF 16/10/9-Add.1); Uruguay, USA (CRD9); Dominica (CRD16); EU (CRD17); Ecuador, Bolivia, Cosa Rica, Guatemala (CRD24); Argentina, Brazil, Dominican Republic, Ecuador, Trinidad and Tobago (CRD25); Ecuador, Brazil, Ghana (CRD26); Peru (CRD29).

102. The Delegation of Ecuador, as Chair of the EWG, introduced the item and drew the attention of the Committee to the conclusions and recommendations described in CX/CF 16/10/9.

103. The Delegation recalled that JECFA77 (2013) had noted that total exposure to cadmium in diets with high levels of cocoa-containing products were apparently overestimated and therefore JECFA did not consider cadmium to be of concern in these products. Following the JECFA advice, the Delegation explained that proposals for MLs for cadmium were therefore derived on the basis of achievability with minimum negative impact on trade.

104. The Delegation, however, noted that there was no consensus in the EWG as to the food categories the MLs should apply i.e. raw material (cocoa beans, cocoa nibs), intermediate products (cocoa liquor, cocoa powder for further processing) or finished products (cocoa-containing products e.g. chocolate, cocoa powder ready-for-consumption, etc.). In an attempt to reach consensus, Recommendations 1 and 3 were put forward leaving the possibility open to continue to work on MLs for finished chocolate products for which a categorisation for different types of chocolates and further data gathering based on the identified types were required, before proceeding with proposals for MLs (Recommendation 1), while setting MLs for intermediate products i.e. cocoa liquor and cocoa powder for further processing that might facilitate the establishment of MLs for the finished products (Recommendation 3). The Delegation also noted that it might be useful to request the advice of CCMAS on methods of analysis available for the determination of cadmium in cocoa and its intermediate and finished products (Recommendation 2) to assist CCCF in the establishment of the MLs.

105. The Delegation also explained that the proposed MLs for cocoa liquor and cocoa powder for further processing were calculated using the worst-case scenario (GEMS/Food Cluster Diet 7) using data from GEMS/Food and ABICAB. A calculation showed that these MLs did not affect consumers' health and had a minimum negative impact on international trade, and therefore both food safety and fair trade practices were ensured by the proposed MLs for cocoa liquor and cocoa powder for further processing in Recommendation 3.

106. The Committee had an exchange of views on the food categories to which the MLs should apply, namely: raw material, intermediate products and/or finished products.

107. Delegations in favour of the establishment of an ML for cocoa beans indicated that these were the products traded worldwide and that it was particularly important for importing countries to set the ML at this stage to ensure good quality of the raw material to further processing cocoa beans into intermediate and finished products. These delegations also recalled that according to the principles for the establishment of MLs in the GSCTFF the MLs are set on primary products in general.

108. Delegations against the establishment of MLs for cocoa beans indicated that setting MLs on the raw material could discriminate between cocoa beans from different sources as the concentration of cadmium in cocoa beans varied depending on geo-climatic conditions, and could therefore introduce technical barriers to trade. In addition, trade patterns might be different as countries might import intermediate products as opposed to cocoa beans for the further elaboration of finished products. It was also noted that post-harvest operations such as cleaning, de-shelling and blending of cocoa beans of different origins might considerably reduce the concentration of cadmium in the cocoa beans.

109. These delegations indicated that setting MLs for finished products was preferable:

- as finished products were the products more relevant to the health of consumers (cocoa beans and intermediate products such as cocoa liquor and cocoa powder for further processing were not commercially available to consumers, they were semi-finished ingredients that were not consumed in this form, but as a finished products)
- chocolate and cocoa products contributed to the highest percentage of the cocoa and chocolate traded commodities worldwide
- setting MLs for intermediate products such as cocoa liquor might have no direct relevance to the concentration of cadmium in the finished product due to variations in cocoa content and industry blending practices that could have a significant reducing effect on cadmium content in the finished product. Therefore industry had greater control over cadmium content in finished products due to blending cocoa beans and powder from different sources and other processing practices that reduces presence of cadmium in the raw material (cocoa), such as cleaning, de-shelling, blending and testing beans
- setting MLs for finished products was consistent with national regulations on cadmium in cocoa and chocolate products.

110. These delegations also noted that in order to set MLs for finished products e.g. chocolate and cocoa powder for direct consumption, a categorisation of such products might be required which should be established on a dry fat free cocoa solids basis rather than on total cocoa solids, as cadmium corresponded to the non-fat dry cocoa solids portion in chocolate products

111. Delegations in favour of the establishment of MLs for intermediate products indicated that this would provide a good basis for the further development of MLs for finished products, in particular chocolates, and for the further categorisation of chocolates. It was noted that the categorisation provided in the *Standard for Chocolate and Chocolate Products* (CODEX STAN 87-1981) might not provide all the necessary percentages to establish MLs considering that the concentration of cadmium is dependent on the percentage of cocoa in the final product. It was noted that if MLs were established for both intermediate products and finished products, the progression of the MLs should be linked so that levels for the intermediate products is consistent with the levels in final products

112. The JECFA Secretariat indicated that the request to JECFA77 was to estimate exposure to cadmium in cocoa and cocoa products. Data submitted was classified according to five GEMS/Food identifiers: cocoa bean, cocoa powder, cocoa mass, cocoa beverages and other cocoa products including chocolate. It was up to CCCF to define the most appropriate food categories to set MLs from the point of view of public health and trade. If the MLs were to be set on finished product, it might be a difficult exercise to cover all cocoa containing products available on the market. Therefore it might be more practical to work on percentages of cocoa in the finished products and not on the type of finished product. In this regard, it might be useful to work on MLs on intermediate products such as cocoa powder.

113. In view of the difficulty to agree on the food categories to which the MLs should apply, the Committee agreed to establish an in-session WG chaired by Ecuador and co-chaired by Brazil and Ghana to discuss with those interested member countries and observer organisations an agreement on the food categories to work on for the establishment of MLs for cadmium.

114. The Committee considered the recommendations of the in-session WG and agreed on the following food categories on which MLs for cadmium would be set:

- intermediate products i.e. cocoa liquor and cocoa powder
- finished products based on total cocoa solids content (%) i.e. chocolate and cocoa powder ready for consumption.

115. The Committee noted the clarification from the Chair of the in-session WG that it would be more practical to work on the MLs based on a total cocoa solids content as this information is readily available on the label.

116. The Committee further agreed that the Codex Secretariat would issue a CL requesting information on: (1) occurrence data of cadmium and designation of origin in the following intermediate products: cocoa liquor and cocoa in powder from cake; (2) occurrence data of cadmium linked with total cocoa solids content (%) or chocolate classification (e.g. bitter, with milk) in the following final products: chocolates and cocoa in powder ready-for-consumption; and to provide the geographic origin of the cocoa raw materials as well as information of the manufacturing country, when available.

117. The Committee agreed that occurrence data and any other information should be submitted to GEMS/Food to ensure quality of data submitted and global analysis of data. The Committee noted that this was consistent with the recommendation of CCCF9 to use the GEMS/Food platform for data submission and analysis for its work in the development of MLs. When additional information needed to be collected that was not part of the database, WG Chairs should consult with the GEMS/Food Secretariat when developing templates for the collection of data.[15]

Conclusion

118. The Committee agreed to re-establish the EWG, chaired by Ecuador and co-chaired by Brazil and Ghana, working in English and Spanish to continue work on the development of MLs in cadmium in the food categories identified in paragraph 114.

STATUS OF THE PROPOSED DRAFT MLS FOR CADMIUM IN CHOCOLATE AND COCOA-DERIVED PRODUCTS

119. The Committee agreed to return the work on MLs for cadmium in chocolate and cocoa-derived products to Step 2/3 for further elaboration, comments and consideration by CCCF11.

15 REP15/CF, para. 108.

DRAFT REVISION OF THE CODE OF PRACTICE FOR THE PREVENTION AND REDUCTION OF MYCOTOXIN CONTAMINATION IN CEREALS (CAC/RCP 51-2003) (Agenda Item 9) [16]

120. The Delegation of Brazil, as chair of the EWG, presented a revised COP (CRD28) which had been prepared by taking up all the comments received at Step 6. Other than some minor and editorial amendments to the COP, the Delegation highlighted the key issues in the amendments: definitions raised at the last Session were not included as the source of the definitions was not clear and that any definitions developed would affect other Codex documents as the terms were already used with the same meaning, and proposed, if necessary, that a separate document on definitions could be developed for future consideration; terminology of "mycotoxigenic fungi" had been changed to "toxigenic fungi"; "test kits" was replaced with "methods of analysis" to allow more flexibility; more fungi were added in table 1 from the results of the sorghum project (Agenda Item 3); inclusion of good drying practices in paragraph 21 bis and 30; deletion of the sentence regarding moisture content requirement for storage of bagged grains in paragraph 35 which was not scientifically proven; and deletion of washing practices before drying in paragraph 28 to ensure safer storage of grains. The Delegation informed the Committee that the provision for seeds proposed in the sorghum project (Agenda Item 3) was not literally included as it was already covered by general provisions of the COP.

121. The Committee generally supported the revised draft COP, but indicated that some key issues needed to be addressed. In relation to terminology, there was a view of retaining "myco" in mycotoxigenic, but as it was clear that these were from fungi, the Committee agreed to delete "myco" which was redundant. The Committee agreed to replace "collector" in paragraph 9 with "handler" as this term was already used in paragraph 9b.

122. The Committee also agreed to replace "mycotoxin free certified seeds" by "free from toxigenic fungi certified seeds" in paragraph 12 as more correct; added references to the existing COP for PAH and dioxins respectively, in paragraph 21bis; and deleted the sentence on the value (15%) of moisture content of grains during storage in paragraph 36, as this was inconsistent with the information in table 2.

Conclusion

123. The Committee agreed that the draft revised COP (general provision) as amended could be submitted for adoption by the Commission.

STATUS OF THE DRAFT REVISION OF THE CODE OF PRACTICE FOR THE PREVENTION AND REDUCTION OF MYCOTOXIN CONTAMINATION IN CEREALS (CAC/RCP 51-2003)

124. The Committee agreed to forward the draft revised COP to CAC39 for adoption at Step 8 (Appendix IV).

PROPOSED DRAFT ANNEXES TO THE CODE OF PRACTICE FOR THE PREVENTION AND REDUCTION OF MYCOTOXIN CONTAMINATION IN CEREALS (CAC/RCP 51-2003) (Agenda Item 10) [17]

125. The Delegation of Brazil, as chair of the EWG, presented the revised Annexes (CRD28) and highlighted the key points in the amendments present: inclusion of the possibility to use weather forecast to plan the harvests in paragraph 5 of Annex I; and exclusion of indication of use for feed which was already addressed in the main Code in a general manner.

126. The Committee agreed to align the headers in all the annexes with the revised headers in the main Code; in Annex 5, changed "*Aspergillus* infection" to "Aflatoxigenic fungi infection" as the COP on aflatoxins is to reduce not only *Aspergillus* species; and added a provision to indicate that biological methods, like biofungicides and biopesticides could be used as a planting measure.

Conclusion

127. The Committee agreed that the draft revised annexes to the COP as amended could be submitted for adoption by the Commission.

STATUS OF THE PROPOSED DRAFT ANNEXES TO THE CODE OF PRACTICE FOR THE PREVENTION AND REDUCTION OF MYCOTOXIN CONTAMINATION IN CEREALS (CAC/RCP 51-2003)

128. The Committee agreed to forward the draft revised Annexes to CAC39 for adoption at Step 5/8 (Appendix IV).

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16 REP15/CF Appendix VII; comments of Brazil, Canada, Kenya (CX/CF 16/10/10); comments of Canada, El Salvador, Ghana, Indonesia, Peru, Republic of Korea, Sudan, USA, AU (CRD10); EU (CRD17); Mali (CRD27); Brazil (CRD28); Peru (CRD29).

17 CX/CF 16/10/11; comments of Canada, Colombia, Costa Rica, Ecuador, Indonesia, Iran, Kenya, Sudan, AU (CX/CF 16/10/11-Add.1); USA (CRD11); EU (CRD17); Mali (CRD27); Brazil (CRD28); Peru (CRD29).

PROPOSED DRAFT CODE OF PRACTICE FOR THE PREVENTION AND REDUCTION OF MYCOTOXIN CONTAMINATION IN SPICES (Agenda Item 11)[18]

129. The Delegation of Spain, as chair of the EWG, presented the item and informed the Committee that the WG had prepared a draft COP, but that there were still some outstanding issues on which guidance from the Committee was needed with respect to whether dried aromatic herbs should be included in the scope; and whether the use of certain packaging technologies (e.g. vacuum and modified atmosphere packaging (MAP)), and smoke-drying processes should be included as potential measures in the COP. The Delegation proposed that the Committee consider the recommendations outlined in paragraph 6 of document CX/CF 16/10/12 in order to provide guidance to the WG so that it could proceed with the further development of the COP.

130. In relation to the annexes, the Delegation informed the Committee that the working group was proposing to use the same categories of spices, as developed by CCSCH which were based on their morphology and parts of plants, as well as on their major utility and terminology used in global trade. The WG had prepared an initial draft annex for dried fruits and berries, as an example, which was based on the available information for practices to reduce OTA in chilli/paprika, but that there was no information on whether aflatoxins are also reduced by these practices. Furthermore, in order to undertake a better overall assessment on whether annexes were needed, for which spices or groups of spices and for which mycotoxins and how to structure the annexes, i.e. by group of spices or by mycotoxins (aflatoxin and OTA), information on proven practices were needed. The Delegation proposed that a CL be issued, similar to the decision taken for the Code of Practice for the Prevention and Reduction of Arsenic in Rice (Agenda Item 7) to request such information.

Discussion

Recommendations on the general COP

Recommendation a

131. The Committee agreed to limit the scope of work to that for spices only, noting that the production and processing practices were different between spices and culinary herbs.

Recommendations b and c

132. The Committee agreed to include packaging technologies that ensure the maintenance of moisture, such as vacuum or modified atmosphere packing, as useful technologies, while acknowledging that these technologies were expensive and not always practical for use by all countries, but could be considered as options for use. It was also agreed to include the smoke-drying processes already widely used by countries.

Recommendation d

133. The Committee agreed that it was necessary to consider the ongoing CCSCH work with regard to categorisation of spices, as well as the work being undertaken by the working group on MLs for spices and other Committees, to ensure that there was no overlap and inconsistencies between the various sets of work.

Recommendation e

134. The Committee agreed to include a reference to the *Code of Hygienic Practice for Low Moisture Foods* (CAC/RCP 75-2015) and its annex on spices and culinary herbs, and to not repeat general guidance from this annex, but only in those cases where it was necessary to build on the measures already included in the annex on spices and culinary herbs in CAC/RCP 75–2015.

Annexes

135. The Committee noted that there was a need for further consideration on the approach, but that the categories mentioned in the report were a useful starting point. It was noted that there might not be a direct correlation of the grouping of spices for the annexes with the priority spices for the development of MLs as the intent of work on the annexes was to consider whether the same agricultural, production and handling measures could apply to groups of spices.

Conclusion

136. The Committee agreed to:

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18 CX/CF 16/10/12; comments of Costa Rica, Ecuador, India, Indonesia, Kenya, Sudan, Republic of Korea, AU (CX/CF 16/10/12-Add.1); Peru, Thailand, USA (CRD12), Dominica (CRD16); EU (CRD17); El Salvador (CRD21); Mali (CRD27).

- continue work on the COP and its annexes(for total aflatoxins and for OTA), and to use the categories of spices as a starting point
- issue a CL to request information on all available proven measures used in practice to reduce contamination by mycotoxins in spices that would help guide the development of possible annexes to the COP
- re-establish the EWG, chaired by Spain and co-chaired by The Netherlands and India to continue the drafting of the COP and its annexes taking into account the discussion at this session, written comments submitted to this session; and the information to be provided by the aforementioned CL.

STATUS OF THE PROPOSED DRAFT CODE OF PRACTICE FOR THE PREVENTION AND REDUCTION OF MYCOTOXINS IN SPICES

137. The Committee agreed to return the COP and its annexes to Step 2/3 for further development, comments and consideration by CCCF11.

DISCUSSION PAPER ON AN ANNEX FOR ERGOT ALKALOIDS TO THE CODE OF PRACTICE FOR THE PREVENTION AND REDUCTION OF MYCOTOXIN CONTAMINATION IN CEREALS (CAC/RCP 51-2003) (Agenda Item 12) [19]

138. The Delegation of Germany presented the discussion paper (CX/CF 16/10/13). The Delegation explained that the main point of the paper was to demonstrate the need for an annex. The Delegation highlighted that there were safety concerns with ergot and ergot alkaloids in cereals which have been known since the Middle Ages; and that in 2012 the EFSA had defined a group TDI for ergot alkaloids, which was confirmed by Germany's Federal Institute for Risk Assessment. The assessment revealed the potential risk for consumers eating greater portions of contaminated cereal based products.

139. The Delegation further noted that the prevention of contamination with these mycotoxins was not fully covered by general provisions of CAC/RCP 51-2003 as the way of infection was different from other toxigenic fungi; and management practices of the crop differed at some points from management of other fungi infections amongst others, and therefore there was a need for a specific annex to address those safety key points not covered by the general provisions of CAC/RCP 51-2003.

140. The Delegation also indicated that a proposed draft annex had been prepared for consideration by the Committee.

141. The Committee supported inclusion of an annex for ergots and ergot alkaloids and noted that this work was part of the work on annexes to the CAC/RCP 51-2003.

Conclusion

142. The Committee agreed to circulate the proposed draft annex for comments at Step 3 (Appendix V). The Committee further agreed to establish an EWG, chaired by Germany and co-chaired by the United Kingdom, working in English only, to prepare a revised proposed draft taking into account written comments received for consideration by CCCF11.

DISCUSSION PAPER ON DEVELOPMENT OF MAXIMUM LEVELS FOR MYCOTOXINS IN SPICES (Agenda Item 13)[20]

143. The Delegation of India, as Chair of the EWG, introduced the item and explained that the aim of the 0work was to prioritise spices for which MLs could be established and to determine for which mycotoxins. The EWG had considered data on global occurrence and rejection of spices due to various mycotoxins and MLs established at national and regional level. Based on the available data the EWG had identified two groups of spices for which MLs could be established. The first priority group, included spices that were predominantly traded internationally and were contaminated with higher concentrations of mycotoxins and should be considered first for the establishment of MLs. The second priority group, for which less data were available, could be considered as a second priority. Two project documents were prepared for consideration by the Committee. It was further noted that further data was needed to assess other widely traded spices for inclusion at a later stage.

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19 CX/CF 16/10/13; comments of the European Flour Millers (CRD05); Kenya, Sudan, AU (CRD13); EU (CRD17); Mali (CRD27).

20 CX/CF 16/10/14; comments of Egypt, Ghana, India, Kenya, Republic of Korea, Thailand, USA, AU (CRD14); Dominica (CRD16); EU (CRD17); Malaysia (CRD20); El Salvador (CRD21); India (CRD23); Mali (CRD27); Peru (CRD29).

Discussion

144. Delegations generally agreed with the principle and approach of the EWG and the need to establish MLs for the spices identified, but that clarity was needed on whether the MLs would be set for each of the spices in the priority groups or for a priority group as a whole. They were also of the view that it was not necessary to establish MLs for both total aflatoxin and AFB1 as AFB1 would be included in total aflatoxin, and that a similar approach should be taken as for peanuts and tree nuts, while a view was also expressed that the ML should be for AFB1 as it was the most toxic and most widely distributed.

145. As regards consistency between the grouping for the purposes of specific annexes in the COP for mycotoxins in spices and the establishment of MLs for mycotoxins in spices it was noted that the rationale for the grouping was different in the COP (good agricultural and other management practices to contain contamination with mycotoxins in spices which might deserve a more botanical classification) and the MLs which was based more on occurrence and consumption data as well as other relevant data to carry out the risk assessment. It was further noted that both groupings were still at the early stage of development and that final groupings would become clearer as work on the COP and MLs progressed.

146. It was also noted that the proposed project documents indicated that scientific risk assessment by JECFA might be required and this issue had been raised in the in-session WG on Priorities, and the review related to aflatoxin and fumonisins and not OTA, was scheduled for consideration by JECFA83 (November 2016) (see paragraph 166).

147. The Codex Secretariat stressed that it was important that before any new work was submitted for approval by CAC, it was necessary to first address all open questions. The Secretariat stated it would be preferable to wait for the outcome of the JECFA assessment, and proposed that a further discussion paper be prepared for consideration by the next session. The paper could clarify points raised, examine the outcome of the JECFA evaluation (and any other additional relevant data or information available) in order to assist the Committee to take a decision on new work on MLs for mycotoxins in spices.

Conclusion

148. The Committee agreed that further work was needed to expand on the MLs through an EWG chaired by India and co-chaired by the EU, working in English only with the following terms of reference:

- provide a rationale for selection of spices (chilli, paprika, ginger, nutmeg, pepper, turmeric)
- provide rationale for selection of total aflatoxins and OTA
- take into account the outcome of JECFA evaluation of 2016
- consider trade aspects of existing national standards
- prepare a Project document for new work with proposals for MLs for spices.

DISCUSSION PAPER ON MAXIMUM LEVELS FOR METHYLMERCURY IN FISH (Agenda Item 14)[21]

149. The Delegation of Japan, as chair of the EWG, introduced the item. The Delegation reminded the Committee that the last session of the Committee had agreed to establish an ML for methylmercury in fish, but that further work was needed to consider expanding the ML to fish species that can accumulate high methylmercury concentrations. It was recognised that development of the paper would require additional data and that an exposure assessment based on different MLs should be conducted.

150. The Delegation reported that the EWG had requested submission of consumption data for shark, swordfish and blue marlin or any other fish species or groups of similar fish species known to accumulate high levels of methylmercury for three population groups. Data were submitted by three countries on different kinds of fish species, however, one set of consumption data was of a sum of fish and seafood consumption without data at the species level, and could therefore not be considered. Furthermore occurrence data of total mercury were also made available and included into the dataset used for the analyses in the previous discussion papers for CCCF8 (2014) and CCCF9 for calculating methylmercury intake from swordfish, shark, southern Bluefin, tuna-canned and tuna-fresh.

151. The dietary exposure to methylmercury was calculated for specific fish species for which occurrence data and consumption data were available, i.e. tuna-canned (*Thunnus* spp.), Tuna-fresh (*Thunnus* spp.), Cardinalfish and Ribaldo. Due to the developmental neurotoxicity of methylmercury, the dietary exposure not only for the general population, but also for children and woman of child-bearing age was calculated on the basis of consumption data of the whole population (eaters and non-eaters) and “eaters only”.

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21 CX/CF 16/10/15; comments of Colombia, Ecuador, Ghana, India, Indonesia, Kenya, Republic of Korea, Senegal, Thailand, USA, AU (CRD15); Dominica (CRD16); EU (CRD17); FAO and WHO (CRD18); Republic of Korea (CRD19); Mali (CRD27); Peru (CRD29).

152. The calculated dietary exposures for whole population were less than the PTWI of 1.6 ug/kg bw, those for “eaters only” exceeded the PTWI in most of the cases.

153. The Delegation explained that several views were expressed in the EWG, including those not supporting the establishment of an ML and the Committee should therefore confirm the decision of CCCF9 to develop ML(s); and take a decision for which species the ML should be developed.

Discussion

154. The Chair reminded the Committee that CCCF9 had already agreed to establish an ML for methylmercury, but that it was still necessary to determine to which fish the levels should apply and proposed to limit the discussion on the species for which MLs should be established. She proposed that the Committee should consider establishing MLs for tuna as a start and that further consideration could be given to expanding the ML to other fish species in the future.

155. The Representative of FAO referring to the comments of FAO/WHO (CRD18), highlighted the outcome of the 2010 FAO/WHO expert consultation on the risk/benefit analysis of fish consumption, the occurrence data in the GEMS/Food database and the list of fish species for which the risks outweigh the health benefits. The Representative noted that this information had not fully been incorporated by the EWG.

156. While there was some support for establishing an ML for tuna as a starting point, many other views were also expressed as follows:

- consumer advisories were preferable to control methylmercury exposure or should be used in conjunction with ML for methylmercury
- the ML should be for total mercury rather than for methylmercury due to the difficulties with the chemical analysis of methylmercury
- MLs should not be limited to tuna only, but be extended to all fish species as well to other seafoods; or to other predatory fish known to accumulate methylmercury; and that further data should be made available to determine an ML for other fish/predatory fish
- the establishment of the MLs should consider the information provided by the FAO/WHO expert consultation
- if the ML was limited to tuna, it was still necessary to determine the species of tuna for which the ML should be established; and whether it should be for fresh (and frozen) whole tuna and/or canned tuna
- there was too limited occurrence data to set an ML for canned tuna, and more data would be required. Two approaches were proposed if an ML for canned tuna were to be established: by derivation from the ML for fresh tuna using processing factors or through directly assessing occurrence data of canned tuna.

157. The Committee was reminded that many of these issues had been addressed in previous papers presented to the Committee and that several tuna species had been identified for which an ML could be established.[22]

158. It had also previously been demonstrated that there was a correlation between total mercury and methylmercury concentration in fish and that it would only be necessary to analyse for methylmercury in cases where the measurement of total mercury exceeded the ML.[23]

159. The Committee also noted a comment that in the presence of selenium, methylmercury could be non-toxic as selenium binds methylmercury and that it was important to consider the selenium content in fish when considering an ML for methylmercury.

Conclusion

160. The Committee agreed that it would establish an ML for tuna, but that it was not ready at this point to submit a project document to the CAC through the CCEXEC for approval of new work, as it was necessary to determine whether it was possible to establish a single ML for tuna or whether it should be set for different species of tuna, and whether it was possible and appropriate to set MLs for canned tuna.

22 CX/CF 15/9/13, para. 46.
23 REP14/CF, para.112.

161. The Committee agreed to establish an EWG, chaired by The Netherlands, and co-chaired by New Zealand and Canada, working in English only to prepare a discussion paper presenting a proposal for:

- one ML for fresh and frozen tuna, or for MLs for different tuna species, if the need of differentiation is justified
- an ML for canned tuna, if possible and appropriate, and to determine whether it should be based on occurrence data or derived from the ML(s) for fresh tuna
- the need for MLs for other species of fish, based on the information in CRD18 and other relevant sources, together with a project document.

PRIORITY LIST OF CONTAMINANTS AND NATURALLY OCCURRING TOXICANTS PROPOSED FOR EVALUATION BY JECFA (Agenda Item 15)[24]

162. The Delegation of the USA, as Chair of the in-session WG, presented the report on the outcome of the discussion on the priority list (CRD2).

163. The Committee was informed that three substances remain on the priority list, i.e. dioxins, inorganic arsenic and scopoletin. The Committee was further informed that aflatoxins, fumonisins, 3-MCPD esters, glycidyl esters, diacetoxyscirpenol and sterigmatocystin had been removed from the list since they were scheduled for evaluation by JECFA83 in November 2016 and a call for data had been issued.

164. The Committee noted the following new proposals for inclusion in the priority list:

- ergot alkaloids – risk assessment and examination of correlation between ergot sclerotia and alkaloid
- aflatoxins and fumonisins in spices and culinary herbs – occurrence and exposure assessment and examination of their contribution to total exposure and health risk
- ergot alkaloids were included for consideration of a possible public health concern. The commodity standards for wheat and oats contain provisions on the maximum content of ergot sclerotia, but these were only listed under the quality or quality and safety provisions, respectively, in those standards, In addition to a risk assessment on ergot alkaloids it was necessary to determine if a correlation between the occurrence of ergot sclerotia and ergot alkaloids could be established. Based on this assessment the Committee should consider to transfer the levels for ergot sclerotia from the commodity standards into the GSCTFF. The Committee noted that a risk assessment of ergot alkaloids by EFSA was available, and a study of the correlation between occurrence of ergot sclerotia and alkaloids by EU was ongoing
- regarding aflatoxins and fumonisins in spices and culinary herbs, the Committee noted that as JECFA was already assessing these mycotoxins, an addendum to the JECFA83 meeting would be added; and the JECFA Secretariat would publish an addendum to the current data call extending the deadline for an additional month to request occurrence data on aflatoxins and fumonisins in spices and culinary herbs.

Recommendation 1

Priority List of contaminants and naturally occurring toxicants proposed for evaluation by JECFA

165. On the request by Tunisia to include fumonisins in wheat to evaluate the feasibility of setting MLs, the Representative of WHO informed that the JECFA83 would focus on fumonisins in maize and maize products, but if the Committee agreed, an exposure assessment on fumonisins in wheat could be included and an additional data request could be added to the above mentioned addendum of the call for data.

166. The Delegation of India noted that the scope of the work on MLs for spices included OTA (Agenda Item 13), and asked the reason why OTA was not included in the Priority List even though data were available. The Representative of FAO clarified that fumonisins and aflatoxins were already scheduled for evaluation and spices could be added for these two mycotoxins, however, it was difficult to add an additional mycotoxin to the agenda of the JECFA83 meeting, but it could be added to the priority list in future.

167. The Committee agreed with the recommendations of the WG, with addition of fumonisins in wheat, and some editorial amendments to the priority list.

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[24] REP15/CF, Appendix IX; comments of Costa Rica (CX/CF 16/10/16); CRD2 (Report of the in-session WG on Priorities).

Recommendation 2

Follow up of recent JECFA assessments:

168. The Committee agreed that an EWG chaired by EU would prepare a discussion paper on the review of the *Code of Practice for the Prevention and Reduction of Dioxin and Dioxin-like PCB Contamination in Food and Feeds* (CAC/RCP 62-2006) to evaluate if recommendations from the JECFA assessment on non-dioxin like PCBs could be included.

169. Because of concerns regarding the potential genotoxicity and carcinogenicity of PAs, a number of follow up activities by CCCF were discussed by the WG, including suggestions for collection of additional occurrence data, drafting of a discussion paper that details follow up actions, and the need to inform the CCSCH of JECFA's assessment and also of the *Code of Practice for Weed Control to Prevent and Reduce Pyrrolizidine Alkaloid Contamination in Food and Feed* (CAC/RCP 74-2014) and the importance to implement the good practices therein. The Committee noted that it was premature to develop a discussion paper at this point, and agreed to discuss PAs at its next Session once the full JECFA evaluation becomes available.

170. The Committee recalled the MLs for total aflatoxins in ready-to-eat peanuts had been held at Step 4 pending the outcome of the JECFA exposure assessment for health impact. Noting that this would be addressed at the JECFA83 meeting, the Committee agreed that the Delegation of India would prepare proposals for MLs taking into account the outcomes of the JECFA83 meeting for consideration by CCCF11.

Conclusion

171. The Committee endorsed the priority list of contaminants and naturally occurring toxicants for JECFA evaluation as amended (Appendix VI) and agreed to re-convene the in-session WG at its next session.

172. The Committee further agreed to continue to request comments and/or information on the priority list for consideration by CCCF11.

173. The Committee agreed to consider at its next session:

- a discussion paper on possible inclusion of non-dioxin like PCBs in the *Code of Practice for the Prevention and Reduction of Dioxin and Dioxin-like PCB Contamination in Food and Feeds* (CAC/RCP 62-2006)
- proposed draft MLs for total aflatoxins in ready-to-eat peanuts following the JECFA evaluation;
- PAs following the outcome of the JECFA evaluation.

OTHER BUSINESS AND FUTURE WORK (Agenda Item 16)

174. The Committee noted that there was no other business and future work to consider.

DATE AND PLACE OF THE NEXT SESSION (Agenda Item 17)

175. The Committee was informed that CCCF11 was tentatively scheduled to be held in Brazil in approximately one year's time, the final arrangements being subject to confirmation by the Host Country and the Codex Secretariat.

SUMMARY STATUS OF WORK

SUBJECT MATTER	STEP	ACTION BY	DOCUMENT REFERENCE (REP16/CF)
Draft maximum level for inorganic arsenic in husked rice	8	CAC39	para. 45, Appendix II
Proposed draft maximum levels for lead in fruit juices and nectars ready-to-drink (inclusion of passion fruit); canned fruits (inclusion of canned berries and other small fruits); canned vegetables (inclusion of canned leafy vegetables and canned legume vegetables); jams, jellies and marmalades (lower ML and inclusion of marmalades); pickled cucumbers (lower ML); preserved tomatoes (lower ML and deletion of the note on the application of a concentration factor); and table olives (lower ML)	5/8	CAC39	para.89, Appendix III
Draft revised *Code of Practice for the Prevention and Reduction of Mycotoxin Contamination in Cereals* (CAC/RCP 51-2003)	8	CAC39	para.124, Appendix IV
Proposed draft annexes on zearalenone, fumonisins, ochratoxin A, trichothecenes and aflatoxins to the *Code of Practice for the Prevention and Reduction of Mycotoxin Contamination in Cereals* (CAC/RCP 51-2003)	5/8	CAC39	para.128, Appendix IV
Proposed draft annex on ergot and ergot alkaloids in cereal grains (Annex to the *Code of Practice for the Prevention and Reduction of Mycotoxin Contamination in Cereals* (CAC/RCP 51-2003))	3	CCCF11	para.142, Appendix V
Proposed draft maximum levels for lead in selected fruits and vegetables (fresh and processed) and other selected food categories	2/3	EWG (USA) CCCF11	para. 85
Proposed draft Code of Practice for the Prevention and Reduction of Arsenic Contamination in Rice	2/3	EWG (Japan / Spain) CCCF11	para. 100
Proposed draft maximum levels for cadmium in chocolate and cocoa-derived products	2/3	EWG (Ecuador / Brazil / Ghana) CCCF11	para.119
Proposed draft Code of Practice for the Prevention and Reduction of Mycotoxin Contamination in Spices and its annexes	2/3	EWG (Spain / The Netherlands / India) CCCF11	para.137
Proposed draft maximum level for total aflatoxins in ready-to-eat peanuts	2/3	India CCCF11	para.173
Revocation of maximum levels for lead in the GSCTFF namely: canned raspberries, canned strawberries, canned green beans and canned wax beans, canned green peas, jams (fruit preserves) and jellies, pickled cucumbers, preserved tomatoes, and table olives	---	CAC39	para.90 Appendix III
Discussion paper on maximum levels for mycotoxins in spices	---	EWG (India / EU) CCCF11	para.148

SUBJECT MATTER	STEP	ACTION BY	DOCUMENT REFERENCE (REP16/CF)
Discussion paper on methylmercury in fish	---	EWG (The Netherlands / New Zealand / Canada) CCCF11	paras. 160 - 161
Discussion paper on non-dioxin like PCBs in the *Code of Practice for the Prevention and Reduction of Dioxins and Dioxin-like PCB*	---	EWG (EU) CCCF11	para. 173
Follow up on JECFA evaluation – Pyrrolizidine Alkaloids (PAs)	---	CCCF11	para.173
Priority list of contaminants and naturally occurring toxicants proposed for evaluation by JECFA	---	CCCF11	para.171, Appendices VI and VII

APPENDIX I

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LISTE DES PARTICIPANTS
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APPENDIX II

DRAFT MAXIMUM LEVEL FOR INORGANIC ARSENIC IN HUSKED RICE

(At Step 8)

ARSENIC

Commodity / Product Name	Maximum Level (ML) mg/kg	Portion of the commodity to which the ML applies	Notes/remarks
Rice, husked	0.35	Whole commodity	The ML is for inorganic arsenic (As-in). Countries or importers may decide to use their own screening when applying the ML for As-in in rice by analysing total arsenic (As-tot) in rice. If the As-tot concentration is below the ML for As-in, no further testing is required and the sample is determined to be compliant with the ML. If the As-tot concentration is above the ML for As-in, follow-up testing shall be conducted to determine if the As-in concentration is above the ML.

APPENDIX III

PROPOSED DRAFT REVISED MAXIMUM LEVELS FOR LEAD IN SELECTED FRUITS AND VEGETABLES (FRESH AND PROCESSED) IN THE GENERAL STANDARD FOR CONTAMINANTS IN FOOD AND FEED (CODEX STAN 193-1995)

(At Step 5/8)

LEAD

Commodity/Product Name	Maximum Level (ML) mg/kg	Portion of the Commodity/Product to which the ML applies	Notes/Remarks
Canned fruits	0.1	The ML applies to the product as consumed.	Relevant Codex commodity standards are CODEX STAN 242-2003, CODEX STAN 254-2007, CODEX STAN 78-1981, CODEX STAN 159-1987, CODEX STAN 42-1981, CODEX STAN 99-1981, CODEX STAN 60-1981, CODEX STAN 62-1981
Canned vegetables	0.1	The ML applies to the product as consumed.	The ML does not apply to canned brassica vegetables. Relevant Codex commodity standard is CODEX STAN 297-2009.
Fruits	0.1	Whole commodity. Berries and other small fruits: whole commodity after removal of caps and stems. Pome fruits: whole commodity after removal of stems. Stone fruits, dates and olives: whole commodity after removal of stems and stones, but the level calculated and expressed on the whole commodity without stem. Pineapple: whole commodity after removal of crown. Avocado, mangos and similar fruit with hard seeds: whole commodity after removal of stone but calculated on whole fruit.	The ML does not apply to cranberry, currant and elderberry.

Commodity/Product Name	Maximum Level (ML) mg/kg	Portion of the Commodity/Product to which the ML applies	Notes/Remarks
Fruit juices	0.03	Whole commodity (not concentrated) or commodity reconstituted to the original juice concentration, ready to drink. The ML applies also to nectars, ready to drink.	The ML does not apply to juices exclusively from berries and other small fruit. Relevant Codex commodity standard is CODEX STAN 247-2005.
Jams (fruit preserves) and jellies and marmalades	0.1		Relevant Codex commodity standard is CODEX STAN 296-2009
Pickled cucumbers (cucumber pickles)	0.1		Relevant Codex commodity standard is CODEX STAN 115-1981.
Preserved tomatoes	0.05		Relevant Codex commodity standard is CODEX STAN 13-1981.
Table olives	0.4		Relevant Codex commodity standard is CODEX STAN 66-1981.

REVOCATION OF MAXIMUM LEVELS FOR LEAD FOR INDIVIDUAL STANDARDS FOR CANNED FRUITS AND VEGETABLES IN THE GENERAL STANDARD FOR CONTAMINANTS AND TOXINS IN FOOD AND FEED

(following the establishment of maximum levels for lead in in the above-mentioned commodities)

(for adoption by CAC)

Product name	Maximum level (mg/kg)	Notes/Remarks
Canned raspberries	1	Relevant Codex commodity standard is CODEX STAN 60-1981.
Canned strawberries	1	Relevant Codex commodity standard is CODEX STAN 62-1981.
Canned green beans and canned waxed beans	1	Relevant Codex commodity standard is CODEX STAN 297-2009.
Canned green peas	1	Relevant Codex commodity standard is CODEX STAN 297-2009.
Canned jams (fruit preserves) and jellies	1	Relevant Codex commodity standard is CODEX STAN 296-2009.
Canned pickled cucumbers	1	Relevant Codex commodity standard is CODEX STAN 115-1981.
Preserved tomatoes	1	Relevant Codex commodity standard is CODEX STAN 13-1981.
Table olives	1	Relevant Codex commodity standard is CODEX STAN 66-1981.

APPENDIX IV

DRAFT REVISED CODE OF PRACTICE FOR THE PREVENTION AND REDUCTION OF MYCOTOXIN CONTAMINATION IN CEREALS (CAC/RCP 51-2003)

(At Step 8)

INTRODUCTION

1. Toxigenic fungi are prevalent in regions in climatic zones which allow for small and large scale cereal grain production. Although the species and strains may differ among grain-producing regions, these fungi are present in soils, in wild host plant species, in the residues of cultivated crops and stored grains and in the dust in drying and/or storage facilities. The fungi are associated with both pre-harvest and postharvest mycotoxin contamination in cereals.

2. The severity of pre-harvest fungal propagation is highly dependent upon weather conditions varying greatly from year to year in grain-producing regions. The severity of pre-harvest infection and propagation of toxigenic fungi can also vary with the degree of damage caused by insects and other non-toxigenic fungi. Because of these factors, mycotoxin concentrations observed in grains at harvest vary widely from year to year. Reliable prevention of pre-harvest fungal infection has been proven to be elusive, even with application of good agricultural practices (GAP) and commercially available fungicides. Cereal breeding has resulted in only modest gains in genetic resistance to the *Fusarium* ear blight (*Fusarium* head blight) of cereals in cultivars with acceptable quality, yield and tolerance to other important cereal diseases.

3. The severity of post-harvest fungal infection and propagation during prolonged periods of grain storage can be managed more predictably through GAP and good manufacturing practices (GMP) that ensure that moisture levels in stored grain remain below levels that are conducive to germination of spores of common post-harvest fungal species specific to the environmental conditions present in the region. However, research has confirmed that spores of such species are ubiquitous in soils, equipment, and storage structures despite diligent cleaning. Consequently, germination of the spores of the mycotoxigenic species can occur within certain temperature ranges if even a small amount of stored grain develops elevated moisture levels from exposure to precipitation or insect infestation. The size and design of large grain storage structures and the limited access to technology often make precise monitoring of moisture and temperature in stored grain extremely difficult or otherwise impractical.

4. Risk of post-harvest fungal infection and production of mycotoxins in stored grain increases with the duration of storage. However, long term storage, generally throughout an entire crop year or for even longer periods, may be required depending on the grain needs of the specific production region where the commodity is being stored. This may be due to reasons of food security and the continuous input into storage of necessary cereal grains for direct consumption, processing and/or animal feed.

5. The complete prevention of dissemination by pre-harvest and post-harvest toxigenic fungal species is not practically achievable, even when GAP and GMP are followed. Therefore, the intermittent presence of certain mycotoxins in cereal grains destined for human food and animal feed use is to be expected. Thus diligent monitoring of cereal grains in the field and during storage for indications of the various conditions that promote fungal contamination and mycotoxin accumulation is imperative to determine disposition of the commodity.

6. This Code of Practice provides current and relevant information for all countries to consider in their efforts to prevent and reduce mycotoxin contamination in cereal grains, grain-derived foods and animal feeds. In order for this Code of Practice to be effective, it will be necessary for national authorities, producers, marketers, and processors in each country to consider the general principles and examples of GAP and GMP provided in the Code, taking into account their local crops, climate, and agronomic practices to enable and facilitate adoption of these practices where relevant and feasible. This Code of Practice is expected to apply to all cereal grains and cereal products relevant to human dietary intake and health as well as international trade.

7. It is important for grain producers to realise that GAP, including postharvest, storage, handling procedures, represent the primary line of defence against contamination of cereals with mycotoxins, followed by the implementation of GMP during the handling, storage, processing and distribution of cereals for food and animal feed. Processing industries also have a role to implement GMP where required, mainly during grain sorting, cleaning and processing.

8. Cereal grain producers should be trained to follow GAP and maintain a close relationship with agricultural advisors, extension services and national authorities to obtain information and advice regarding the choice of appropriate cereal grain cultivars and plant protection products suitable for use in their respective production regions so as to reduce incidence and levels of mycotoxins.

9. This Code of Practice contains general principles for the reduction of various mycotoxins in cereals. For the education of producers, handlers and processors, and providing information on testing to relevant parties, the following should be observed:

    a) National authorities and/or other organisations should educate producers regarding the environmental factors that favour infection and growth of toxigenic fungi, and mycotoxin production in cereal crops at the farm level. Emphasis should be placed on the fact that the planting, pre-harvest and postharvest strategies for a particular crop will depend on the climatic conditions of that particular region and year, taking into account the local crops, and traditional production methods for that particular country or region. National authorities should support scientific research on methods and techniques to prevent fungal growth in the field and during harvest and storage.

    b) In order to avoid undue disruption of grain shipment operations, validated analytical methods and associated sampling plans should be utilised by producers/handlers/processors to quickly determine mycotoxin levels. The proper implementation of sampling plans and use of any such analytical methods or tools are critical to their provision of accurate information and data. This will require adequate resources and training to ensure that sampling plans are followed and test procedures can be properly performed. Procedures should be in place to properly handle, through segregation, reconditioning, recall or diversion, cereal crops that may pose a threat to human and/or animal health.

10. This Code for the prevention and reduction of mycotoxins in cereal grains and grain-derived foods and feeds recommends practices based on GAP and GMP and are generally consistent with Hazard Analysis Critical Control Points (HACCP) principles which are incorporated into current food safety practices and certification schemes now in global use in production, storage, handling, transportation, processing, distribution and trade. The implementation of HACCP principles will minimise mycotoxin contamination through applications of preventive control measures to the extent feasible, mainly during storage and processing of cereals.

I. RECOMMENDED PRACTICES BASED ON GOOD AGRICULTURAL PRACTICES (GAP) AND GOOD MANUFACTURING PRACTICES (GMP)

Planting and crop rotation

11. Consider developing and maintaining an appropriate crop rotation/sequence schedule to avoid planting the same crop in the same field, for two consecutive seasons. This can help to reduce the inoculum in the field which may originate from debris remaining after harvest that harbours toxigenic fungal spores. Some crops have been found to be particularly susceptible to certain species of toxigenic fungi and the use in rotation with each other should be evaluated. Table 1 shows the most susceptible crops to toxigenic fungi and the mycotoxins that can be produced. Some of these crops are infected after harvest and the resulting seeds can carry toxigenic fungal spores. Crops of low susceptibility to toxigenic fungi such as clover, alfalfa and other legumes can be used in rotation to reduce the inocula in the field. Wheat and maize have been found to be particularly susceptible to *Fusarium* species and they should not be used at very close positions in rotation with each other, if possible. When used in the same rotation, inclusion of soybeans, oilseeds, pulses and forage crops may reduce the incidence and severity of pre-harvest infection.

Table 1. Susceptible rotation crops to toxigenic fungi associated with production of mycotoxins (not exhaustive).

Crops	Fungi	Potential of Mycotoxins
Peanuts	*Aspergillus flavus* *A. parasiticus* *A. nomius* And other related species	Aflatoxins
Maize	*A. flavus* *A. parasiticus* and other related species	Aflatoxins
	Fusarium graminearum *F. culmorum*	deoxynivalenol,nivalenol, zearalenone
	F.verticillioides *F. proliferatum*	fumonisins
Sorghum	*Fusarium graminearum* *Fusarium* spp.	deoxynivalenol,nivalenol, zearalenone and diacetoxyscirpenol
	Alternaria spp.	alternariol, alternariol methyl ether, tenuazonic acid and altenuene
	F. verticillioides *F. proliferatum*	fumonisins
	A. flavus *A. parasiticus* *A.* section *Flavi*	Aflatoxins
	P. verrucosum *A. ochraceus* and related species *A. carbonarius* *A. niger*	ochratoxin A
	Claviceps purpurea *C. Africana* *C. sorghi* and related species	ergot alkaloids
	A. versicolor	sterigmatocystin
Wheat	*Alternaria* spp.	alternariol, alternariol methyl ether, tenuazonic acid
	F. graminearum *F. culmorum* *F. asiaticum*	deoxynivalenol,nivalenol, zearalenone
Barley	*F. graminearum* *F. culmorum* *F. asiaticum*	deoxynivalenol,nivalenol, zearalenone
Oats	*F. graminearum* *F. culmorum* *F. langsethii*	deoxynivalenol,nivalenol, zearalenone, T-2 and HT-2 toxin
Rye	*F. graminearum* *Claviceps purpurea*	deoxynivalenol, ergot alkaloids
Cotton	*A. flavus* *A. parasticus*	Aflatoxins
Millet	*F. graminearum*	Deoxynivalenol
Triticale	*F. graminearum*	Deoxynivalenol

Tillage and preparation for seeding (planting)

12. When possible and practical, use toxigenic fungi free certified seeds and prepare the seed bed for each new crop by plowing under or by destroying or removing old seed heads, stalks, and other debris that may have served, or may potentially serve as substrates for the growth of mycotoxin producing fungi. However, tilling may not be appropriate with respect to other economic and environmental benefits, such as moisture conservation, maintenance of soil organic matter, reduced erosion, and lower fuel and water use, hence its costs and benefits should be considered prior to application.

13. Utilise the results of soil tests to determine if there is a need to apply fertilizer and/or soil conditioners to assure adequate soil pH and plant nutrition to avoid plant stress, especially during seed development stage of crop growth.

14. When available, grow varieties (cultivars) that were developed and selected for their traits of providing at least partial resistance to both non-toxigenic and toxigenic fungi and insect pests and for lower mycotoxin accumulation. It is important to plant only those varieties recommended for use in a particular area of a country by virtue of their specific physiological and agronomic traits.

15. As far as practical, crop planting should be timed to avoid high temperature and drought stress during the period of seed development and maturation. Predictive models, when available, could be used as a tool to plan for the best planting period.

16. Ensure appropriate density of planting by maintaining the recommended row and intra- plant spacing for the species/varieties grown. Information concerning plant- spacing may be provided by seed companies, national authorities or extension services.

Pre-harvest

17. Where possible, minimise insect damage and fungal infection in the vicinity of the crop by proper use of approved pesticides and other appropriate practices within an integrated pest management programme. Predictive weather models could be used to plan the best application timing and mode of pesticide application.

18. As certain weed species can act as hosts for toxigenic fungi that can increase plant stress due to competition of weed species during crop development, it is important to control weeds in the crop by using mechanical methods, registered herbicides or other safe and suitable weed eradication practices utilising an integrated pest management programme.

19. Minimise mechanical damage to plants during cultivation, irrigation and pest management practices. Minimise lodging of plants to prevent contact of the aerial parts of the plants with soil, particularly at the flowering stage of the crop. Soil and soil water are sources of inoculum (spores) of toxigenic fungal species.

20. If irrigation is used, ensure that it is applied evenly and that all plants in the field have an adequate supply of water. Irrigation is a valuable method of reducing plant stress in some growing situations. Excess precipitation during anthesis (flowering) makes conditions favourable for dissemination and infection by *Fusarium spp*.; thus irrigation during anthesis and during the ripening of the crops, specifically wheat, barley, and rye, should be avoided.

21. Plan to harvest grain at low moisture content and full maturity, unless allowing the crop to continue to full maturity would subject it to extreme heat, rainfall or drought conditions. Delayed harvest of grain already infected by *Fusarium* species may cause an increase in the mycotoxin content of the crop. Models could be used to predict the mycotoxin production based on environmental conditions, such as climate conditions and agricultural production conditions, being a guide to timely monitoring and surveying of mycotoxin levels.

22. If mechanical drying equipment is available, earlier harvest may be helpful in limiting mycotoxin production during the final stages of crop maturation. It is important to use proper drying techniques in order to avoid contamination by contaminants generated by improper drying techniques such as polycyclic aromatic hydrocarbons (PAH)[1] and dioxins[2].

23. Before harvest ensure that all equipment, to be used for harvesting, drying, cleaning and storage of crops, is in a good working order and cleaned of crop residues, grain and dust as much as possible. A breakdown of equipment during this critical period may cause grain quality losses and enhance mycotoxin formation. Keep important spare parts available on the farm to minimise time loss from repairs. Make sure that the equipment needed for moisture content measurements is available and calibrated.

Harvest

24. Containers and conveyances (e.g. wagons, trucks) to be used for collecting and transporting the harvested grain from the field to drying facilities, and to storage facilities after drying, should be clean, dry and free of crop residues, old grain, grain dust, insects and visible fungal growth before use and re-use.

25. Methods of harvest and equipment used vary widely among grain-producing countries. Cutting of grain into swaths prior to combining or threshing by other means can contribute to contact with the soil and exposure to fungal spores. As far as possible, avoid mechanical damage to the grain and avoid contact with soil during the harvesting operation. Steps should be taken to minimise the spread of infected seed heads, chaff, stalks, and debris (crop residues) onto the ground where spores and other fungal structures may survive and serve as inocula for future crops. Mechanised harvest methods such as the use of combines result in large amounts of the crop residue being left in the field. Where crop rotation/ sequence and related tillage practices permit, it is preferable to incorporate this crop residue into the soil by ploughing or cultivation by other means.

26. During harvesting operation, the moisture content should be determined in several spots of each load of the harvested grain since the moisture content may vary considerably within the same field. As far as possible, avoid harvesting grain with high moisture content due to precipitation or morning dew or during late afternoon as it takes a longer time to dry. If possible, when preharvest monitoring or surveying of grain shows a field as having a higher *Fusarium* infection rate, harvest and store grain from such field(s) separately from those fields with a lower infection rate.

27. Harvested grain that has not been dried to a safe storage moisture level should not be stored or transported in bins, wagons or trucks for prolonged periods of time. Transit time for movement from field to drying facility should be minimised unless the grain is already at acceptable storage moisture levels before harvest. When necessary it is recommended that the trucks and containers be opened, to increase aeration and minimise the condensation effects.

Drying and cleaning before storage

28. Avoid piling, heaping, or bin storage of high-moisture, freshly harvested commodities for more than a few hours prior to drying or threshing to lessen the risk of fungal growth. If it is not possible to dry the commodities immediately, aerate them by forced air circulation.

29. When necessary pre-cleaning before drying can be carried out to remove large amounts of straw or other plant material that can carry mould or mould spores. Winnowing and sorting methods can be utilised to clean the grain. If cleaning equipment is available, it is advantageous to mechanically clean grain to remove foreign material, seeds of other plant species, and crop residues prior to transfer to storage structures. However it is important that the grain is not damaged during the procedure.

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1 *Code of Practice for the Reduction of Contamination of Food with Polycyclic Aromatic Hydrocarbons (PAH) from Smoking and Direct Drying Processes* (CAC/RCP 68-2009)

2 *Code of Practice for the Prevention and Reduction of Dioxin and Dioxin-like PCB Contamination in Food and Feeds* (CAC/RCP 62-2006)

30. It is very important to ensure that moisture levels in harvested grains are low enough to permit safe storage for even relatively short periods of time ranging from a few days to a few months. A maximum level of 15% moisture is generally considered to be low enough to prevent further growth of preharvest toxigenic fungi and germination of spores of fungi that typically infect grain and produce mycotoxins during storage, such as *Penicillium.*

31. Freshly harvested cereals should be dried immediately in such a manner that damage to the grain is minimised and moisture levels are lower than those needed for fungal growth during storage. It is preferable to reduce grain moisture content to an acceptable level prior to transfer to storage bins and other storage structures. If it is not possible to dry the commodities immediately, aerate them by forced air circulation and keep the period before drying as short as possible. Mechanical drying is preferred. Flat bed and re-circulating batch driers are adequate for small scale operations while using a continuous flow-dryer is preferred for large scale drying prior to long storage periods. Grains should not be excessively dried or subjected to excessively high drying temperatures in order to preserve nutritional quality and suitability for milling or other processing. The use of good drying practices is essential to avoid contaminants generated by the process. Avoid accumulating too much grain in the pre-drier storage or “wet tank”, especially when field conditions are warm. Store grains only enough that can be easily dried in a suitable time period.

32. If mechanical means of drying are not available, sun and open air drying should be done on clean surfaces; to the extent possible. Grains should be protected from rain, dew, soil, pests, bird droppings and other sources of contamination during this process. For more even and faster drying, mix or stir grains frequently in thin layers.

33. After drying, cereal grain should be cleaned to remove damaged and immature kernels and other foreign matter. Kernels containing symptomless infections cannot be removed by standard cleaning methods. Seed cleaning procedures, such as gravity tables and optical sorting, may remove broken kernels that are susceptible to infection.

Storage after drying and cleaning

34. It is important that bins, silos, sheds and other buildings intended for grain storage are dry, well-vented structures that provide protection from rain, snow, ground water, moisture condensation, and the entry of rodents, birds and insects that cannot only contaminate grain, but damage grain kernels to render them more susceptible to mould infection. Ideally, storage structures should be designed so as to minimise wide fluctuations in the temperature of the stored grain.

35. Storage facilities should be cleaned prior to receiving grain to remove dust, fungal spores, grain, crop residues, animal and insect excreta, soil, insects, foreign material such as stones, metal and broken glass, and other source of contamination.

36. For bagged commodities, ensure that bags are clean, dry and stacked on pallets or incorporate a water impermeable layer between the bags and the floor. The bags should facilitate aeration and be made of non-toxic food-grade materials that do not attract insects or rodents and are sufficiently strong to resist storage for longer periods.

37. Determine moisture content of the lot, and if necessary, dry the crop to the moisture content recommended for storage. Fungal growth in grain is closely related with water activity (a_w), commonly defined in foods as the water that is not bound to food molecules (such as milled grain products) that can support the growth of bacteria, yeasts, and fungi. Although the appropriate moisture content for fungal growth on various grains is different, the maximum a_w to avoid fungal growth is basically the same. It is recognised that fungal growth is inhibited at a_w of less than 0.70. The appropriate level of moisture content of grain should be determined based on cereal variety, kernel size, grain quality, storage period and storage condition (e.g. temperature). In addition, safe storage guidance may be provided to reflect the environmental situation in each region. Table 2 shows values of moisture content in relation to different water activities at 25ºC for some cereals.

Table 2. Values of grain moisture content in relation to water activities at 25ºC for some cereals.

Cereal	Moisture content (%) at various water activities			
	0.60	**0.65**	**0.70**	**0.75**
Rice	13.2	13.8	14.2	15.0
Oat	11.2	12.2	13.0	14.0
Rye	12.2	12.8	13.6	14.6
Barley	12.2	13.0	14.0	15.0
Maize	12.8	13.4	14.2	15.2
Sorghum	12.0	13.0	13.8	14.8
Wheat	13.0	13.6	14.6	15.8

38. Ongoing monitoring of the condition of stored grain is essential to ensure the grain is kept at acceptable temperature and moisture levels and substantially free of rodents, and stored product pests such as grain beetles, weevils and mites. Significant fluctuations in grain temperature and increases in grain moisture can provide favourable conditions for mould growth and production of mycotoxins. Physical damage to grain kernels during storage caused by rodents and pests, such as insects and mites, can also contribute to increases in mould growth. The mycotoxin level in inbound and outbound grain should also be measured when relevant, using adequate sampling and testing programs that is appropriate to the mycotoxin monitoring system.

39. To more effectively monitor the condition of stored grain, it is advisable, if possible, to measure the temperature and humidity of the storage facilities and the stored grain at regular time intervals during storage. A grain temperature rise of 2-3°C may indicate microbial growth and/or insect infestation. If the temperature or moisture becomes unacceptably high, where possible, aerate the grain by circulation of air through the storage area to maintain proper and uniform temperature levels. Aeration should be conducted, if possible, during periods of low ambient relative humidity of air being forced through the mass of stored grain. Aeration during periods of high relative humidity can actually increase condensation and a_w in stored grain whose temperature is below ambient air temperature. Grain can also be transferred from one storage container to another to promote aeration and disruption of potential hot spots during storage. If grain spoilage or mould growth in grain is observed, separate the apparently infected portions of the grain and collect samples for mycotoxin analyses, using appropriate sampling plans. When spoiled grain is removed, it is extremely important to minimise the mixing of the spoiled grain with the remaining portion of grain that appears to be in good condition. Small quantities of highly contaminated grain can greatly increase mycotoxin levels in grain that is otherwise in good condition. After spoiled grain has been removed, it may be necessary to aerate the remaining grain to lower the temperature and the moisture to acceptable levels.

40. For cold climate countries, it is important to note that reduction of grain temperature below 15º C that can occur during colder months of temperate grain-producing regions will contribute to safe storage and prevention of mould growth and mycotoxin production. Extremely cold temperatures will also inhibit insect growth and reproduction, reducing the risk of insect damage, which can facilitate mould growth.

41. Use good housekeeping procedures to minimise the levels of rodent pests, insects and fungi in storage facilities. This may include the use of suitable, registered insecticides and fungicides or appropriate alternative methods within an integrated pest management programme. Care should be taken to select and use only those pest control products that will not create a safety concern based on the intended end use of the grains and the maximum levels of pesticide residue dictated by regulation or buyer specifications. Since rodent pests can damage the crop during storage, the storage facility must be kept free of rodents such as rats and mice to the extent possible.

42. The use of a suitable, approved preservative (e.g. organic acids such as propionic acid) may be beneficial. These acids are effective in killing various fungi and thus prevent the production of mycotoxins in grains intended only for animal feed. The salts of the acids are usually more effective for long-term storage. Care must be taken because these compounds can negatively affect the taste and odour of the grain.

43. Document the harvesting, drying, cleaning and storage procedures implemented each season by making notes of measurements (e.g. temperature, moisture, and humidity) and any deviation or changes from traditional practices. This information may be very useful for explaining the cause(s) of fungal growth and mycotoxin formation during a particular crop year and help to avoid similar occurrences in the future. Management measures taken by making use of validated predictive models, when available, could be used to control fungal growth and mycotoxin production during these procedures.

Transport from storage

44. Transport containers, vehicles such as trucks and railway cars and vessels (boats and ships) should be dry and free of old grain, grain dust, visible fungal growth, musty odour, insects and any contaminated material that could contribute to mycotoxin levels in lots and cargoes of grain. As necessary, transport containers should be cleaned and disinfected with appropriate substances (which should not cause off-odours, flavour or contaminate the grain) before use and re-use and be suitable for the intended cargo. The use of registered fumigants or insecticides may be useful. At unloading, the transport container should be emptied of all cargo and cleaned as appropriate.

45. Shipments of grain should be protected from additional moisture by using covered or airtight containers or tarpaulins. Minimise temperature fluctuations and measures that may cause condensation to form on the grain, which could lead to local moisture build-up and consequent fungal growth and mycotoxin formation.

46. Avoid insect, bird and rodent infestation during transport by the use of insect-and rodent proof containers or insect and rodent repellent chemical treatments if they are approved for the intended end use of the grain.

Processing and cleaning after storage

47. Sorting and cleaning are effective processes to remove contaminated grains and reduce mycotoxin content in cereals. Visibly mouldy infected and/or damaged kernels should be discarded in order to prevent their entry into the food and livestock feed supply chains. This is particularly important if the grain is intended for direct human consumption rather than industrial processing.

48. Analytical testing can be used as a tool to monitor mycotoxin concentrations throughout the cereal grain supply chain. It is important that sampling plans and analytical testing are properly implemented in order to provide accurate and representative results. In some cases, simple screening tests are commercially available for certain mycotoxins, such as DON; however, the proper implementation of sampling plans and use of any such tests or tools is critical to their provision of accurate information and data. This will require commitment of adequate resources and training so that sampling plans and test procedures can be properly performed. It is important that the cereal grains removed from storage for transport are tested at loading or unloading for mycotoxin concentrations before going into storage at grain processing facilities, especially when the risk of mycotoxin contamination is high as a consequence of unfavourable conditions during grain production and harvest. Lots containing higher levels of mycotoxins should undergo extensive cleaning and processing that significantly decreases mycotoxins to acceptable levels in order to guarantee a safe product to consumers.

49. Brushing, scouring and peeling to remove hulls and bran layers of the grain can significantly reduce mycotoxin content in milling fractions derived from the endosperm (i.e. flour) as the outer parts of the kernel of most cereal grains typically contains higher mycotoxin levels or adhering contaminated dust. Such redistribution of the mycotoxins present in unprocessed grains can result in unacceptably high levels of mycotoxins in other fractions (e.g. bran) and products that contain such fractions. Where these fractions are to be used for food use rather than being discarded, it is also important to monitor mycotoxin levels to ensure food safety in the products as consumed. Caution and proper procedures should be followed when using such removed fractions as animal feed.

50. Industrial dry milling of grain to produce whole grain products containing all portions of the unprocessed kernels in their naturally occurring relative proportions will not reduce mycotoxin levels from those observed in the unprocessed grain. Dry milling processes that segregate some or all of the hull and bran layers of the grain can significantly reduce the mycotoxin content of milled products derived from grain endosperm (inner portions of kernels) used as food ingredients to levels below those present in the unprocessed grain. Wet milling of maize grain isolates most mycotoxins from the starch fraction used as food ingredients.

51. Milled grain products that are stored for long periods of time are also susceptible to mould growth and increased mycotoxin levels imparted by the mould species Therefore, it is important to avoid storing flour and other milled grain products for long periods of time, but if it is unavoidable, then the products should be stored in proper storage containers and safe moisture levels should be maintained with minimum temperature changes. Such containers must deter insect and rodent infestation and should be subject to integrated pest control measures.

52. For grain products and grain-derived foods that pass through a fermentation step, poorly preserved starter cultures can be significant sources of mycotoxin contamination. The starter cultures should be maintained pure, viable and sealed to prevent water access and other contamination.

53. The beer steeping process (soaking and germination phases) raises the seed moisture level to about 45% which is favourable for fungal growth and mycotoxin production. The situation is problematic if the process is done under open, poor sanitary conditions. Therefore, steeping should be carried out in weatherproof containers under controlled atmosphere.

54. All grain processing activities should follow good hygiene practices and HACCP-based GMP.

PROPOSED DRAFT ANNEXES TO THE CODE OF PRACTICE FOR THE PREVENTION AND REDUCTION OF MYCOTOXIN CONTAMINATION IN CEREALS (CAC/RCP 51-2003)

(At Step 5/8)

ANNEX 1

PREVENTION AND REDUCTION OF CONTAMINATION BY ZEARALENONE IN CEREAL GRAINS

RECOMMENDED PRACTICES BASED ON GOOD AGRICULTURAL PRACTICES (GAP) AND GOOD MANUFACTURING PRACTICES (GMP)

1. Good Agricultural Practices and Good Manufacturing Practices include methods to reduce *Fusarium* infection (mainly *F. graminearum* and *F. culmorum*) and zearalenone (ZEN) production in cereals during the crop growth and development, harvest, storage, transport and processing. However, ZEN occurs primarily due to preharvest infection of maize, wheat and barley with the relevant *Fusarium* spp.

Planting and crop rotation

2. Refer to paragraph 11 in the general Code of Practice.

Tillage and preparation or seeding (planting)

3. Refer to paragraphs 12-16 in the general Code of Practice.

Pre-harvest

4. Refer to paragraphs 17-23 in the general Code of Practice.

5. The establishment of toxigenic *Fusarium* infection in cereal heads during flowering may need to be monitored before harvest by inspection, sampling and determination of infection by standard microbiological methods. Also, mycotoxin content in representative preharvest samples may need to be determined. Utilisation of the crop should be based on prevalence of infection and mycotoxin content of the grain.

6. ZEN risk in wheat increases with pre-harvest rainfall especially if harvest is then delayed. Predictive modelling for risk of *Fusarium* infection may be useful to plan to harvest grain before wet weather conditions prevailIn parallel with predictive modelling for risk of *Fusarium* infection weather forecast may be used for planning the harvest.

Harvest

7. Refer to paragraphs 24-27 in the general Code of Practice.

Drying and cleaning before storage

8. Refer to paragraphs 28-33 in the general Code of Practice.

Storage after drying and cleaning

9. Refer to paragraphs 34-43 in the general Code of Practice.

Transport from storage

10. Refer to paragraphs 44-46 in the general Code of Practice.

Processing and cleaning after storage

11. Refer to paragraphs 47-54 in the general Code of Practice.

12. Wet milling of wheat and maize can result in significant reduction of ZEN levels in starch fractions intended for food use. However, ZEN is in effect redistributed to the by-products of starch, gluten and sweetener production that are typically used for animal feed.

ANNEX 2

PREVENTION AND REDUCTION OF CONTAMINATION BY FUMONISINS IN CEREAL GRAINS

RECOMMENDED PRACTICES BASED ON GOOD AGRICULTURAL PRACTICES (GAP) AND GOOD MANUFACTURING PRACTICES (GMP)

1. Good Agricultural Practices and Good Manufacturing Practices include methods to reduce *Fusarium* infection (mainly *F. verticillioides* and *F. proliferatum*) and fumonisin contamination of cereals during the crop growth and development, harvest, storage, transport and processing.

Planting and crop rotation

2. Refer to paragraph 11 in the general Code of Practice.

Tillage and preparation or seeding (planting)

3. Refer to paragraphs 12-16 in the general Code of Practice.

Pre-harvest

4. Refer to paragraphs 17-23 in the general Code of Practice.

Harvest

5. Refer to paragraphs 24-27 in the general Code of Practice.

6. The time of harvest for maize should be carefully planned. It has been shown that maize grown and harvested during warm months may have fumonisin levels significantly higher than maize grown and harvested during cooler months of the year. Predictive models developed for the risk of *Fusarium* infection may be used for planning the best harvest time.

Drying and cleaning before storage

7. Refer to paragraphs 28-33 in the general Code of Practice.

Storage after drying and cleaning

8. Refer to paragraphs 34-43 in the general Code of Practice.

Transport from storage

9. Refer to paragraphs 44-46 in the general Code of Practice.

Processing and cleaning after storage

10. Refer to paragraphs 47-54 in the general Code of Practice.

11. Nixtamalization is a process that involves boiling and soaking maize in a solution of calcium hydroxide to remove the hull. This process may reduce fumonisin levels in the treated maize as well as in the masa flour used in making corn tortillas, tamales, pupusas and other masa derived products.

12. Extrusion of maize may decrease fumonisin levels, however part of it is bound to proteins, sugars or other compounds in food matrices.

ANNEX 3

PREVENTION AND REDUCTION OF CONTAMINATION BY OCHRATOXIN A IN CEREAL GRAINS

RECOMMENDED PRACTICES BASED ON GOOD AGRICULTURAL PRACTICES (GAP) AND GOOD MANUFACTURING PRACTICES (GMP)

1. Good Agricultural Practices and Good Manufacturing Practices include methods to reduce *Aspergillus* (mainly *A. ochraceus* and related species, *A. carbona*rius and *A. niger*) and *Penicillium* (mainly *P. verrucosum*) infection and ochratoxin A (OTA) contamination of cereals during crop growth and development, harvest, storage, transport and processing.

Planting and crop rotation

2. Refer to paragraph 11 in the general Code of Practice.

3. Do not grow cereals close to cocoa trees, coffee bean plants or grape vines as these crops are highly susceptible to ochratoxigenic fungi and OTA contamination and can represent a source of inoculum to the soil.

Tillage and preparation or seeding (planting)

4. Refer to paragraphs 12-16 in the general Code of Practice.

Pre-harvest

5. Refer to paragraphs 17-23 in the general Code of Practice.

6. Although OTA is associated with postharvest fungal growth in stored grains, frost damage, presence of competitive fungi, excessive rainfall and drought stress are preharvest factors that may affect levels of OTA in harvested grains. Crop lodging on the field can also result in the production of OTA in humid conditions.

Harvest

7. Refer to paragraphs 24-27 in the general Code of Practice.

Drying and cleaning before storage

8. Refer to paragraphs 28-33 in the general Code of Practice.

9. OTA is produced in cereals due to poor drying or storage conditions. Grain should be allowed to dry as much as possible before harvest consistent with local environment and crop conditions. If it is necessary to harvest the grain before its water activity becomes lower than 0.70, dry the grain to a moisture content corresponding to a water activity of less than 0.70 (preferably 0.65). In a temperate climate region, when intermediate or buffer storage is necessary because of low drying capacity, make sure that the moisture content is lower than 15%, the buffer storage time is less than 10 days, and the grain temperature is lower than 20°C, in general. Appropriate conditions for intermediate or buffer storage may be determined on the basis of cereal variety, kernel size, grain quality and outside air temperature.

Storage after drying and cleaning

10. Refer to paragraphs 34-43 in the general Code of Practice.

Transport from storage

11. Refer to paragraphs 44-46 in the general Code of Practice.

Processing and cleaning after storage

12. OTA is highly stable and does not degrade in primary processing (e.g. milling into flour) or further processing (e.g. baking into bread). Its distribution in unprocessed grain is heterogeneous, as the toxin is typically present in high concentrations in a very small number of grain kernels (“hot spots”). As grain is processed, the OTA is redistributed among milled grain fractions, yielding lower levels in endosperm flour fractions and higher levels in bran fractions relative to those found in the unprocessed grain.

13. Refer to paragraphs 47-54 in the general Code of Practice.

ANNEX 4

PREVENTION AND REDUCTION OF CONTAMINATION BY TRICHOTHECENES IN CEREAL GRAINS

RECOMMENDED PRACTICES BASED ON GOOD AGRICULTURAL PRACTICES (GAP) AND GOOD MANUFACTURING PRACTICES (GMP)

1. Good Agricultural Practices and Good Manufacturing Practices include methods to reduce trichothecenes producing *Fusarium* spp infection and trichothecene contamination of cereals during crop growth and development, harvest, storage, transport and processing. The more common trichothecenes are deoxynivalenol (DON) produced mainly by *F. graminearum* and *F. culmorum*), T-2 toxin, HT-2 toxin (produced mainly by *F. sporotrichioides* and *F. poae*),, diacetoxyscirpenol (DAS produced by *F. equisiti, F. poae, F. acuminatum*) and nivalenol (NIV) produced by *F. asiaticum, F. poae,F. culmorum* and *F. graminearum*)

Planting and crop rotation

2. Refer to paragraph 11 in the general Code of Practice.

Tillage and preparation or seeding (planting)

3. Refer to paragraphs 12-16 in the general Code of Practice.

Pre-harvest

4. Refer to paragraphs 17-23 in the general Code of Practice.

5. Use predictive models developed for risk of *Fusarium* infection of wheat and other small grains, which may assist producers in decisions on the necessity and timing of fungicide application. The establishment of *Fusarium* infection in cereal heads during flowering may need to be monitored before harvest by sampling and determination of infection by standard microbiological methods. Also, mycotoxin content in representative preharvest samples may need to be determined. Utilisation of the crop as food or animal feed should be based on prevalence of infection and mycotoxin content of the grain.

Harvest

6. Refer to paragraphs 24-27 in the general Code of Practice.

7. Do not permit mature grains to remain in the field for extended periods of time, particularly in cold, wet weather to avoid T-2 and HT-2 toxins formation.

Drying and cleaning before storage

8. Refer to paragraphs 28-33 in the general Code of Practice.

Storage after drying and cleaning

9. Refer to paragraphs 34-43 in the general Code of Practice.

Transport from storage

10. Refer to paragraphs 44-46 in the general Code of Practice.

Processing and cleaning after storage

11. Refer to paragraphs 47-54 in the general Code of Practice.

12. Extrusion of cereal may reduce trichothecene levels in processed products, especially of DON.

13. Separated hulls and seed coat (bran layers) fractions from processed grains to be used in foods may contain unacceptably high levels of DON and must be examined for DON levels before they are processed into consumable products.

ANNEX 5

PREVENTION AND REDUCTION OF CONTAMINATION BY AFLATOXINS IN CEREAL GRAINS

RECOMMENDED PRACTICES BASED ON GOOD AGRICULTURAL PRACTICES (GAP) AND GOOD MANUFACTURING PRACTICES (GMP)

1. Good Agricultural Practices and Good Manufacturing Practices include methods to reduce aflatoxigenic fungi infection (mainly *A. flavus, A. parasiticus* and *A. nomius*) and aflatoxin production in cereals during the crop growth and development, harvest, storage, transport and processing.

Planting and crop rotation

2. Refer to paragraph 11 in the general Code of Practice.

3. If available and cost effective, extension officers should assist the farmers in procuring and releasing non aflatoxigenic *A. flavus* and *A. parasiticus* into the agricultural environment to suppress the natural occurrence of the aflatoxigenic fungi following the instructions of the manufacturer. Biological methods could be used, like other biofungicides and biopesticides.

Tillage and preparation or seeding (planting)

4. Refer to paragraphs 12-16 in the general Code of Practice.

Pre-harvest

5. Refer to paragraphs 17-23 in the general Code of Practice.

6. Biological methods can be used for the control of aflatoxins, but the applied product must be approved by relevant authorities, safe, and cost-effective towards the targeted toxin producing fungi.

Harvest

7. Refer to paragraphs 24-27 in the general Code of Practice.

Drying and cleaning before storage

8. Refer to paragraphs 28-33 in the general Code of Practice.

9. Aflatoxins occur in maize before harvest due to growth of toxigenic fungi as the result of insect infestation, bird and other animal damage, drought stress, hail damage or a combination of these factors. Aflatoxins rarely occur in small grains, except in sorghum and as a result of poor storage practices. Grain should be allowed to be as dry as possible before harvest in a way consistent with the local environmental and crop conditions. If it is necessary to harvest the grain before water activity becomes lower than 0.70, the grain is to be dried to a moisture content corresponding to a water activity of less than 0.70 (preferably 0.65) immediately after the harvest and as soon as possible. In temperate climate regions, when intermediate or buffer storage is necessary because of low drying capacity, ensure that the moisture content is less than 15%, the buffer storage time is less than 10 days, and the grain temperature is lower than 20°C, in general. Appropriate conditions for intermediate or buffer storage may be determined on the basis of cereal variety, kernel size, grain quality and outside air temperature.

Storage after drying and cleaning

10. Refer to paragraphs 34-43 in the general Code of Practice.

11. The formation of aflatoxins in cereals should be prevented during storage by minimizing the time between harvest and appropriate drying for storage and transport and maintaining the moisture content at a safe level (<0.70).

Transport from storage

12. Refer to paragraphs 44-46 in the general Code of Practice.

Processing and cleaning after storage

13. Refer to paragraphs 47-54 in the general Code of Practice.

14. Nixtamalization is a process that involves boiling and soaking maize in a solution of calcium hydroxide to remove the hull. This process may reduce aflatoxin levels in the treated maize as well as in the masa flour used in making corn tortillas, tamales, pupusas and other masa derived products.

APPENDIX V

ANNEX 6 TO THE CODE OF PRACTICE FOR THE PREVENTION AND REDUCTION OF MYCOTOXIN CONTAMINATION IN CEREALS (CAC/RCP 51-2003)

PREVENTION AND REDUCTION OF CONTAMINATION BYERGOT AND ERGOT ALKALOIDS IN CEREAL GRAINS

(At Step 3)

RECOMMENDED PRACTICES BASED ON GOOD AGRICULTURAL PRACTICE (GAP) AND GOOD MANUFACTURING PRACTICE (GMP)

1. Good Agricultural Practice includes methods to reduce *Claviceps* fungal infection and ergot alkaloid contamination in cereals in the field and during planting, harvest, storage, transport and processing.

Planting and crop rotation

2. Refer to paragraphs 11-16 in the general Code of Practice.
3. Work the soil by turning it over, when the preceding crop (in the rotation) has been infected by ergot; as far as is possible, the working of the soil should involve use of a plough. For cases in which the soil is worked without using a plough, the incision into the soil should be deeper than 5 cm.
4. When cultivating varieties with higher susceptibility to ergot, admixture of population varieties is an option to consider. Take into account the climate conditions of the given location.
5. Select the thickness and depth of seed, distances between rows, the density of sown material, fertiliser and use of growth regulator, on the basis of adapting to the specific situation, so as to attain an even and rapid blossoming of the crop and to avoid late-bolting plants.
6. Lay sufficiently wide tramlines for agricultural vehicles.
7. Combat inferior grasses within the cereal under cultivation and also employ a higher level of crop hygiene at the field's edge: ensure effective care of the margin; combat host plants by cutting them before blossoming of the crop.

Pre-harvest

10. Refer to paragraphs 17-23 in the general Code of Practice.
11. Consider a partial harvesting of the crop as an option: separately thresh field/subsections with a high incidence of ergot, in a way that is safe for humans and animals.

Harvest

13. Refer to paragraphs 24-27 in the general Code of Practice.
14. There should be an air-stream cleaning during the harvest so as to remove ergots and infected dust.
15. Remove materials detached in cleaning, and also cereal dust, in good order and according to established professional practice; eliminate them in a way that takes them out of the processing chain of activities.

Drying and cleaning before storage

16. Refer to paragraphs 28-33 in the general Code of Practice.
17. Avoid movement of a product consignment contaminated by ergot; as there is a major danger of rub-off and also of adhesive particles of ergot dust. Eliminate all dust particles in each stage of the value-added chain in such a way that they are withdrawn before the next stage in the processing chain.

Storage after drying and cleaning

18. Refer to paragraphs 34-43 in the general Code of Practice.

Transport from storage

19. Refer to paragraphs 44-46 in the general Code of Practice.

Processing and cleaning after storage

20. Refer to paragraphs 47-54 in the general Code of Practice.
21. Carry out a "white cleaning" process (scrubbing, brushing or peeling). Eliminate and dispose of rubbed-off material and also dust generated from taking receipt of the product and from cleaning activities.
22. Check the filter dust in the crusher area and consider the option of removing it from the mill unit, as an additional measure for reducing levels of ergot alkaloid content.

APPENDIX VI

PRIORITY LIST OF CONTAMINANTS AND NATURALLY OCCURRING TOXICANTS FOR EVALUATION BY JECFA

Contaminants and Naturally Occurring Toxicants	Background and Question(s) to be Answered	Data Availability (When, What)	Proposed By
Dioxins[1]	Full evaluation (toxicological assessment and exposure assessment) to update 2001 JECFA assessment and incorporate data on developmental effects from in utero exposures.	EFSA assessment available summer 2017. Canada: occurrence data on foods of animal origin.	Canada
Inorganic Arsenic	2011 JECFA evaluation based on cancer effects. This evaluation would focus on non-cancer effects (neurodevelopmental, immunological and cardiovascular) and could inform future risk management needs.	US: occurrence data on rice cereals, and rice and non-rice products; 2016 risk assessment; 2016 draft action level for inorganic arsenic in rice cereal Brazil: occurrence data in rice, poultry, and pork	USA
Scopoletin[2]	Full evaluation (toxicological assessment and exposure assessment) in fermented Noni juice	To be consulted with CCNASWP on status of the standard for noni juice and data availability	FAO/WHO Coordinating Committee for North America and South-West Pacific (CCNASWP)
Ergot alkaloids[3]	Full evaluation (toxicological assessment and exposure assessment) Evaluate relationship between ergot sclerotia and ergot alkaloids	EFSA (2012) report EU: occurrence data (collecting); assessment on exposures to ergot alkaloids Canada: occurrence information (commodity-specific data, i.e., grading standards)	EU/Canada
Fumonisins in wheat	Frequently detected in wheat, need an assessment to evaluate the need and feasibility of setting MLs	Could be included in additional call for data for JECFA83	Tunisia

[1]Lower priority: JECFA evaluation to build on the ongoing work at national and regional re-assessment of dioxins.
[2]Codex Secretariat will follow up with CCNASWP to obtain additional details on proposal.
[3]Proposals from CCCF10 for new contaminants and naturally occurring toxicants for JECFA Priority List.

APPENDIX VII

NOMINATION OF NEW SUBSTANCES FOR THE PRIORITY LIST OF CONTAMINANTS AND NATURALLY OCCURRING TOXICANTS FOR EVALUATION BY JECFA

1. Basic information

1) Proposal for inclusion submitted by:

2) Name of compound; chemical name(s):

3) Identification of (additional) data (toxicology, metabolism, occurrence, food consumption) which could be provided to JECFA:

4) List of countries where surveillance data are likely to be available, and if possible list of contact person who could provide such data, including quality assurance information on the data.

5) Timeline for data availability:

2. Detail information

1) Whether or not the occurrence of the compound in commodities will have potential to cause public health and/or trade problems;

2) Whether or not commodities containing the compound are in international trade and represent a significant portion of the diet; and,

3) Commitment that a dossier (as complete as possible) will be available for evaluation by the JECFA.

4) Relevant justification and information on the following prioritisation criteria[1]

- Consumer protection from the point of view of health and prevention of unfair trade practices;
- Compliance with CCCF's Terms of Reference;
- Compliance with JECFA's Terms of Reference;
- Compliance with the Codex Alimentarius Commission's Strategic Plan, its relevant plans of work and Criteria for the Establishment of Work Priorities;
- The quality, quantity, adequacy, and availability of data pertinent to performing a risk assessment, including data from developing countries;
- The prospect of completing the work in a reasonable period of time;
- The diversity of national legislation and any apparent impediments to international trade;
- The impact on international trade (i.e. magnitude of the problem in international trade);
- The needs and concerns of developing countries; and,
- Work already undertaken by other international organisations.

[1] Section 3, para.10 of the Risk Analysis Principles Applied by the Codex Committee on Contaminants in Foods (See Procedural Manual of the Codex Alimentarius Commission).